

PB89-221543

Response to Capacity-Related Comments Submitted on the Second
Third Proposed Land Disposal Restrictions Rule

(U.S.) Environmental Protection Agency, Washington, DC

8 Jun 89



U.S. Department of Commerce

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16. Abstract (Limit: 200 words)

The Agency requested public comments on the rule to prohibit the land disposal of the second one-third of the schedule of restricted hazardous wastes, known as the Second Third. The regulated community, environmental organizations, trade associations, State and Federal agencies, and concerned citizens submitted over 90 written comments on the proposed rule. EPA developed three volumes of the comments response document. This volume addresses comments on waste specific capacity concerns.

17. Document Analysis a. Descriptors

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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Response to Capacity-Related Comments
Submitted on the Second Third Proposed
Land Disposal Restrictions Rule

Prepared by:

U.S. Environmental Protection Agency
Office of Solid Waste
Waste Treatment Branch
401 M Street, S.W.
Washington, D.C. 20460

June 8, 1989

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INTRODUCTION

In response to its proposed rules on Second Third wastes, the Environmental Protection Agency has received comments from a total of 13 commenters on its analysis of the adequacy of national capacity to accommodate wastes requiring alternative management techniques.

This report presents the Agency's response to these comments. Since many commenters addressed multiple issues, the Agency has arranged its responses under 6 separate topics that together incorporate all the issues raised. Each topic is assigned a separate category number in this report as follows:

<u>No.</u>	<u>Category</u>
I.	Leachate and Derived-From Wastes
II.	Cyanide-Bearing Wastes
III.	Lab Pack Wastes
IV.	Solids Incineration Capacity
V.	Available Treatment Capacity
VI.	Miscellaneous Capacity Comments

For each comment, the Agency provides the commenter's statements verbatim before presenting its response.

EXHIBIT A

Identification Numbers for Commenters on Capacity
Analysis for the Second Third Waste Proposed Rule

Document identification number	Commenter
LD10-00006	General Dynamics
LD10-00024	National Association of Metal Finishers
LD10-00026	Sterling Chemicals, Inc.
LD10-00034	Chemical Manufacturers Association
LD10-00041	Waste Management, Inc.
LD10-00042	American Petroleum Institute
LD10-00046	Peter Ashbrook
LD10-00048	Dow Chemical Company
LD10-00054	The Chlorine Institute, Inc.
LD10-L0004	United Technologies, Pratt & Whitney
LD10-L0024	Ford Motor Company
LD10-L0028	United Technologies, Pratt & Whitney
LD10-L0030	Michigan Association of Metal Finishers

000003

CATEGORY I
LEACHATE AND DERIVED-FROM WASTES

000004

Comment Number: I-A

Docket Number: LD10-00041

Commenter: Waste Management INC (WMI)

Comment:

II. Second-Third Land Disposal Restrictions As Applied to Leachate

The Agency has agreed with the petitioners in the case of Chemical Waste Management, Inc. v. United States Environmental Protection Agency, (No. 88-1581) to defer oral argument originally scheduled for January 31, 1989 on the question of whether leachate derived from hazardous wastes should be deemed to be all those wastes and hence, subject to all the treatment standards for them. As part of this agreement, EPA will soon issue a Federal Register notice rescheduling leachate to the Third-Third. The Agency is also to issue a second Federal Register to make it clear that the "No Land Disposal" treatment standard applies only to wastes generated by the manufacturing process and not to wastes, such as leachate, derived from their past management.

Because this interim agreement post-dated the Second-Third proposal, we here point out for the record that many statements in the proposal conflict with the agreement. See 54 Fed. Reg. at 1,063, Section III.A.4. This commenter incorporates by reference all the legal and technical submissions it made on the leachate issue in response to the First-Third proposed rules, and in the course of the litigation on the leachate issue. These

000005

Comment Number: I-A (Continued)

Docket Number: LDU-00041

Commenter: Waste Management INC (WMI)

Comment:

submissions show that basing leachate treatment standards on the underlying wastes is inappropriate and result in there being little, if any, treatment capacity permitted to accept all the represented waste codes, or capable of treating leachate to all applicable treatment standards. Rather, we continue to believe leachate is a unique waste that should have its own code and should be subject to treatment standards based on its chemistry.

000006

Comment Number: I-A

Docket Number: LD10-00041

Commenter: Waste Management Inc. (WMI)

Response:

The Agency acknowledges this commenter's concerns about the application of the "derived from" rule to multisource leachates. Many members of the hazardous waste treatment industry and hazardous waste generators maintain that such leachates are sufficiently different chemically from the wastes from which they were derived to suggest the need for separate treatment standards.

The Agency has decided to defer action on multisource leachates (54 FR 8264), except for multisource leachate wastes derived from dioxin-containing hazardous wastes. Multisource leachates will now be included under the Third Third rule, whose prohibition date is May 9, 1990. Residues from treating such leachates would likewise be subject to the Third Third prohibition date, as would soils or ground water contaminated by these leachates. The Agency has taken this step in order to study treatability and capacity issues associated with these wastes.

Existing land disposal restrictions require that multisource leachate, like other mixtures that contain more than one prohibited waste, must be treated to meet the most stringent standard that applies to any of the wastes from which it is derived. EPA adopted this approach in the belief that, since leachate is more dilute than the original wastes, it can

000007

Comment Number: I-A (continued)

Docket Number: LD10-00041

Commenter: Waste Management Inc. (WMI)

Response:

usually be treated to meet any of the applicable standards. Treatability variances are available where this proves not to be the case, and, although information is limited, the Agency is unaware of any data that refute this original approach. By deferring final resolution of this issue until the Third Thirds, EPA hopes to develop additional information on the treatability issue. The Agency will also explore the capacity issue in more detail. Generators claim that there is little, if any, treatment capacity permitted to accept all waste codes that may be associated with some multisource leachates.

The Agency recognizes that few wastewater treatment facilities are capable of treating both organics and inorganics. The few that exist may not be capable of handling all the multisource leachates currently requiring treatment.

Note, however, that rescheduling of multisource leachates does not affect single-source leachates, about which no questions have arisen concerning the validity of the Agency's original approach. Since leachate derived from disposal of a single prohibited waste would indeed be a dilute form of that waste, it is subject to the same treatment standards and the same effective dates.

000008

Comment Number: I-B

Docket Number: LD10-00042

Commenter: Amer. Can Petroleum Institute

Comment:

3. Application of the "Derived from" Rule as Proposed
Likely Would Create Serious Capacity Problems

The proposal requests comments on treatment capacity for multi-source leachate.⁷ Elsewhere, in connection with the first-third rulemaking, EPA has acknowledged that its transfer of all constituent waste codes to leachate and other residues already has caused serious problems in terms of treatment capacity. See 54 Fed. Reg. 4022 (January 27, 1989). API reiterates that it is EPA's erroneous application of the "derived from" rule to residues that is largely responsible for this dilemma and that the most appropriate solution is for EPA to renounce its current interpretation of that rule.

In addition, the evident capacity problems created by EPA's application of the "derived from" rule to leachate and other residues illustrates a larger problem inherent in EPA's approach to setting standards for residues -- i.e., the creation of ever-increasing volumes of waste with (potentially) ever-decreasing risks. EPA's approach to applying BDAT at all levels of treatment results in continuous pressure on capacity to keep up with increasing volume even though the actual risk presented (if any) at certain stages of treatment may not warrant

000009

Comment Number: I-B (Continued)

Docket Number: L010-00042

Commenter: American Petroleum Institute

Comment:

such stringent control. Accordingly, API again urges EPA to modify its position on residues, preferably by revising its interpretation of the "derived from" rule, or, at a minimum, by providing an automatic delisting procedure for residues which no longer contain significant concentrations of the original listed waste.

⁷ API expects to submit additional information on EPA's current estimates of incineration and stabilization capacity in the near future.

000010

Comment Number: I-8

Docket Number: LD10-00042

Commenter: American Petroleum Institute (API)

Response:

The Agency acknowledges this commenter's concerns about the application of the "derived from" rule to multisource leachates and other residues. Many members of the hazardous waste treatment industry and hazardous waste generators maintain that such leachates are sufficiently different chemically from the wastes from which they were derived to suggest the need for separate treatment standards.

The Agency has decided to defer action on multisource leachates (54 FR 8264), except for multisource leachate wastes derived from dioxin-containing hazardous wastes. Multisource leachates will now be included under the Third Third rule, whose prohibition date is May 9, 1990. Residues from treating such leachates would likewise be subject to the Third Third prohibition date, as would soils or ground water contaminated by these leachates. The Agency has taken this step in order to study treatability and capacity issues associated with these wastes.

Existing land disposal restrictions require that multisource leachate, like other mixtures that contain more than one prohibited waste, must be treated to meet the most stringent standard that applies to any of the wastes from which it is derived. EPA adopted this approach in the belief that, since leachate is more dilute than the original wastes, it can usually be treated to meet any of the applicable standards. Treatability

000011

Comment Number: I-B (continued)

Docket Number: LD10-00042

Commenter: American Petroleum Institute (API)

Response:

variances are available where this proves not to be the case, and, although information is limited, the Agency is unaware of any data that refute this original approach. By deferring final resolution of this issue until the Third Thirds, EPA hopes to develop additional information on the treatability issue. The Agency will also explore the capacity issue in more detail. Generators claim that there is little, if any, treatment capacity permitted to accept all waste codes that may be associated with some multisource leachates.

The Agency recognizes that few wastewater treatment facilities are capable of treating both organics and inorganics. The few that exist may not be capable of handling all the multisource leachates currently requiring treatment.

Note, however, that rescheduling of multisource leachates does not affect single-source leachates, about which no questions have arisen concerning the validity of the Agency's original approach. Since leachate derived from disposal of a single prohibited waste would indeed be a dilute form of that waste, it is subject to the same treatment standards and the same effective dates. Furthermore, EPA disagrees with the commenter's contention that the "derived from" rule poses problems for other, nonleachate, residues. EPA believes that, unlike multisource

000012

Comment Number: I-B (continued)

Docket Number: LD10-00042

Commenter: American Petroleum Institute (API)

Response:

leachates, these wastes are simply more dilute forms of the waste from which they were derived and can therefore be expected to meet the treatment standard and effective date applicable to the original waste. Finally, capacity analyses for this and previous rulemakings indicates that capacity will be available to treat all "derived from" treatment residuals, except those for which national capacity variances have already been granted.

000013

Comment Number: T-C

Docket Number: LDIC-00045

Commenter: Dow Chemical Company

Comment:

I. USE OF THE TSDR SURVEY IS INAPPROPRIATE FOR "MIXTURE" AND "DERIVED FROM" WASTES.

The TSDR survey is an inadequate data base for determining quantities of "derived from" and "mixture" rule wastes for RCRA waste codes. The inadequacy of the survey is a result of the TSDR survey's design.

In early 1988, Dow submitted its response to the TSDR survey. In Dow's response all pure form wastes as originally generated were reported as the actual RCRA code. "Mixture" and "derived from" wastes were reported as "X" waste codes as requested on page C-2 of the instructions booklet. The following codes and amounts were reported from one Dow facility.

Code	Amount (tons)	Source
XWWS	131	Filtration of large sewer solids
XWWS	115	Skimmings from sewer flow
XWWS	31,575	Primary and secondary solids from biological treatment plant
XWWL	31,850,000	Wastewater flow to bio plant-centralized treatment
XASH	4,192	Incineration of hazardous and non-hazardous waste
XSCR	2,730,800	Quenching and scrubbing of incinerator gases

This Dow facility also generates 4.5 million tons per year of leachates and groundwaters that are potentially subject to RCRA that were included in the 31,850,000 tons of XWWL but were not listed separately on the survey.

000014

Current Number: T-C (continued)

Docket Number: L D 10 - 00048

Commenter: Dow Chemical Company

Comment:

Note 2 on Page C-1 of the TSDR Survey (3) reads:

These waste codes [X-Codes] were developed to describe hazardous waste residuals that result from the on-site management of many individual RCRA coded wastes which are no longer individually identifiable.

Implying that at least the branch of the EPA conducting the survey felt that "mixture" and "derived from" wastes are sufficiently different to require a new, unofficial RCRA waste code.

Dow's reasoning for presenting the above data is that it is obvious that the TSDR survey is not an adequate data base for determining the specific amounts of "mixture" and "derived from" waste that are handled per RCRA waste code. The amount of XWWL by itself, theoretically K041 among other things, presented above is 4.5 times the EPA's 1.695 million gallon waste total (Table III.C.1.A of the proposal) for which treatment standards are proposed in the second third.

The above presentation is only one example at one facility. One should assume that most facilities followed the survey's instructions. Therefore, the total amounts of wastes for each RCRA waste code is tremendously underestimated.

000015

Comment Number: I-C

Docket Number: LD10-00048

Commenter: Dow Chemical Company

Response:

In the January 11, 1989, proposed rule, "Second Third Waste Volumes, Characteristics, and Required and Available Treatment Capacity," the Agency made capacity determinations using the data from the National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities (the TSDR Survey). The data set contains detailed information on the volumes and characteristics of RCRA hazardous wastes being land disposed, waste "treatability," and the capacity of hazardous waste treatment/recovery technologies. It is important to remember that the Agency estimates of required capacity are based on TSDR Survey information on the volume of waste land disposed annually. Required capacity estimates are not based on the volume of waste generated annually. Therefore, the waste volumes reported by the commenter as being generated at one of its facilities cannot be directly compared to the Agency's estimates of required capacity. The Agency believes that the TSDR Survey data set accurately reflects current national available and required capacity, and therefore is the best information available to make national capacity determinations.

Some volumes of wastes that are considered hazardous because of the "derived from" rule, such as leachate, scrubber water, and incinerator ash, were reported by facilities in the TSDR Survey. These types of

000016

Comment Number: I-C (continued)

Docket Number: LD10-00048

Commenter: Dow Chemical Company

Response:

wastes, when described by a RCRA waste code for which a standard is being finalized, have been included in the analysis of required capacity. However, the Agency recognizes that some derived-from wastes were not reported using specific RCRA waste codes. For the TSDR Survey, X-codes were developed to be used for hazardous waste residuals from onsite management of many individual RCRA waste codes. These X-codes included XLEA for leachate, XSCR for scrubber water, and XASH for incinerator ash. EPA then attributed these reported data to particular hazardous waste codes whenever there was sufficient information elsewhere in the reports to do so.

The Agency acknowledges this commenter's concerns about the application of the "derived from" rule to multisource leachates and other residues. Many members of the hazardous waste treatment industry and hazardous waste generators maintain that such leachates are sufficiently different chemically from the wastes from which they were derived to suggest the need for separate treatment standards.

The Agency has decided to defer action on multisource leachates (54 FR 8264), except for multisource leachate wastes derived from dioxin-containing hazardous wastes. Multisource leachates will now be included under the Third Third rule, whose prohibition date is May 9, 1990.

000017

Comment Number: I-C (continued)

Docket Number: LD10-00048

Commenter: Dow Chemical Company

Response:

Residues from treating such leachates would likewise be subject to the Third Third prohibition date, as would soils or ground water contaminated by these leachates. The Agency has taken this step in order to study treatability and capacity issues associated with these wastes.

Existing land disposal restrictions require that multisource leachate, like other mixtures that contain more than one prohibited waste, must be treated to meet the most stringent standard that applies to any of the wastes from which it is derived. EPA adopted this approach in the belief that, since leachate is more dilute than the original wastes, it can usually be treated to meet any of the applicable standards. Treatability variances are available where this proves not to be the case, and, although information is limited, the Agency is unaware of any data that refute this original approach. By deferring final resolution of this issue until the Third Thirds, EPA hopes to develop additional information on the treatability issue. The Agency will also explore the capacity issue in more detail. Generators claim that there is little, if any, treatment capacity permitted to accept all waste codes that may be associated with some multisource leachates.

000018

Comment Number: I-C (continued)

Docket Number: LD10-00048

Commenter: Dow Chemical Company

Response:

The Agency recognizes that few wastewater treatment facilities are capable of treating both organics and inorganics. The few that exist may not be capable of handling all the multisource leachates currently requiring treatment.

Note, however, that rescheduling of multisource leachates does not affect single-source leachates, about which no questions have arisen concerning the validity of the Agency's original approach. Since leachate derived from disposal of a single prohibited waste would indeed be a dilute form of that waste, it should be subject to the same treatment standards. Furthermore, EPA disagrees with the commenter's contention that the "derived from" rule poses problems for other, nonleachate, residues. EPA believes that, unlike multisource leachates, these wastes are simply more dilute forms of the waste from which they were derived and can therefore be expected to meet the treatment standard and effective date applicable to the original waste. Finally, capacity analyses for this and previous rulemakings indicates that capacity will be available to treat all "derived from" treatment residuals, except those for which national capacity variances have already been granted.

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CATEGORY II
CYANIDE-BEARING WASTES

000020

Comment Number: II-A

Docket Number: LD10-00024

Commenter: NATIONAL Association of Metal Finishers

Comment: VIII. Treatment Capacity

Throughout the BDAT background document and the preamble to the proposed rule, the Agency maintains that well-operated, well-designed wastewater treatment systems will result in the generation of F006 containing no treatable levels of cyanide. As a result, EPA believes no additional treatment capacity for cyanide is necessary. At page 1107 of the proposal, the preamble summarizes EPA's rationale for not granting a national capacity variance:

"In the First Third Final Rule, the Agency estimated that 129 million gallons of F006 waste would require alternative treatment. The Agency believes that these wastes are currently being pretreated for cyanides. Therefore, no additional capacity is believed to be required for F006 nonwastewaters because of today's proposed cyanide standards and a capacity variance is not being proposed."

NAMF disputes EPA's stated belief and the assertion that "well-designed, well-operated" wastewater treatment systems will not contain treatable levels of cyanide. Furthermore, because under the proposal F006 sludge would not be treated to reduce cyanide, the 129 million gallon estimate is meaningless for the purposes of this proposal. (For a discussion of the levels of cyanide in F006 generated by a well-designed, well-operated wastewater system, see the attached letter dated February 20, 1988. Craftsman Plating & Tinning Corporation, Chicago, was one of the "well-designed, well-operated" facilities used to establish the total and amenable cyanide limits for the Electroplating Point Source Category under the Clean Water Act.)

In fact, well-designed and -operated systems will routinely generate an F006 waste with total and amenable cyanide well in excess of the proposed restrictions of 110 mg/Kg (total) and 0.064 mg/Kg (amenable).

000031/2

Comment Number: II-A (continued)

Docket Number: L010-00024

Commenter: NATIONAL Association of Metal Finishers

Comment:

If, therefore, well-operated, well-designed systems will generate a sludge that is above compliance concentrations for cyanide, alternative treatment could be required. The question is: At what point is that treatment applied, before or after generation? EPA "does not believe that stabilization is an applicable technology for the treatment of amenable or complex cyanide constituents in wastes" (page 1066). Therefore, according to the Agency, stabilization is not BDAT for F006. The only other "post-generation" alternative for cyanide removal might be incineration, although the Bureau of Mines has indicated that F006 does not have sufficient BTU value for incineration.

If no post-generation treatment can be identified as BDAT, the alternative is pre-generation manipulation of the process generating the waste to achieve cyanide reduction. EPA's proposal has identified electrolytic oxidation, followed by alkaline chlorination, chemical precipitation, filtration and dewatering and stabilization for the metals.

The practical consequences of EPA's pre-generation BDAT proposal will be to require a staggering amount of on-site or off-site treatment capacity that is not now available, nor will it be available in the foreseeable future.

We believe the data submitted to the Agency by NAMF clearly show that well-designed, well-operated systems will generate a sludge with total cyanide levels far above the proposed limits. Based on that belief, additional treatment will be required to meet the limits. If one rules out post-generation treatment, pre-generation treatment will be required in an amount that is

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Comment:

not now available nor effective.

To illustrate, assume that one-half of the 3300 establishments nationwide in SIC 3471 use cyanide in their processes. Of these 1650 facilities, assume that one-half generate a sludge that will not meet the limits for cyanide. These 825 companies will be required to reduce cyanide levels in their wastes before they are generated. If we further assume that these 825 facilities will be on the low end of cyanide-bearing rinsewater generation, i.e., 60,000 gallons per week, the result is the following determination of required annual treatment capacity (whether off-site or on-site):

825 facilities X 60,000 gal/wk X 50 weeks = 2.475 billion gallons of required treatment capacity annually.

NAMF believes that this calculation is based on conservative assumptions, including 40-hour production weeks and the fact that it includes only on SIC 3471 and does not include captive electroplating operations scattered throughout other SIC Codes (estimated to be an additional 10,000 facilities, a significant fraction of which clearly use cyanide in their processes).

Because EPA incorrectly assumed that existing systems were routinely removing or destroying cyanide prior to generation of F006, the Agency apparently determined that an analysis of available capacity was unnecessary. Unfortunately, NAMF has not had the opportunity to determine the availability of such capacity, on-site or off-site, although we are convinced that it is not now available, nor will it be available by June 8 in the amounts that would be required.

000023

Comment Number: II-A (Continued)

Packet Number: LDIC-00024

Commenter: National Association of Metal Finishers

Comment:

--In attempting to argue that sufficient capacity exists, the proposal wrongly concludes that because electrolytic oxidation and other treatment steps are commercially available for F007-F009 and F011, they must be available and viable for generators of F006. In fact, the amount of treatment capacity needed to meet the proposed BDAT for cyanide-bearing F006 is staggering.

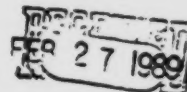
000024



LD10
00024.A Appendix I.

PDC Laboratories, Inc.

4349 Southport Rd. • Peoria, IL 61615
(312) 686-4393



February 2, 1989

Northwestern Plating Works
3114 S. Kolin Avenue
Chicago, IL 60623

Attn: Mr. Jim Jacobs

Subject: BDAT Cyanide
Limitations for F006

Dear Jim:

I am providing several items of information in regard to the proposed regulations governing cyanide in F006 wastes in the January 11, 1989 Federal Register. The items include comments on treatability of F006 wastes to destroy cyanide, analytical considerations and implications, and a list of cyanide values from different F006 generators. The list should give you an idea of what we are seeing as far as cyanide levels in F006 samples we have analyzed.

Treatability:

While it appears there is a list of technologies available to destroy cyanide, the text on page 1.066 of the Federal Register does not give confidence that the methods are field proven. I am familiar that cyanide destruction is commonly used for meeting wastewater pretreatment regulations. The cyanide present in filter cakes are typically residuals of this process. Further treatment of a dewatered filter cake for cyanide by several of the suggested treatments would involve re-wetting the filter cake to allow contact between the oxidizing agent and the cyanide. The wetted sludge may have to be treated (solidified) to remove free liquids. This could result in increased waste volumes and further handling of a hazardous material.

Let us assume that wastewater cyanide destruction is being used and is achieving pretreatment standards. The cyanide present in the sludge then would be due to less than 100% efficiency of the process. While it may be possible, consistent success may be difficult with these treatment technologies in the complex matrix of a treatment sludge if the method is less than completely successful in a wastewater.

Analytical:

The limit for amenable cyanide of 0.0004 mg/kg in sludge cannot be met with standard methodologies for the determination of cyanide. Both cyanide methods 9010 and 9012 in SW 846 state that the methods are "used to determine the concentrations of inorganic cyanide in an aqueous waste or leachate". Solid wastes are not listed as a proper matrix for the method. Nonetheless, most labs do use these methods for determination of cyanide in solid wastes.

Subsidiary of WAX Technical Services, Inc.

000025

For method performance, SW 846 refers the analyst to Method 335.2 of Methods for Chemical Analysis of Water and Wastes. In the precision and accuracy statement for Method 335.2 the following is given: 0.62 mg/l cyanide; standard deviation = 0.094. The proposed amenable cyanide limit is within the standard deviation of the method for a much lower level cyanide in a wastewater sample. The proposed limit for amenable cyanide is smaller than the limits of uncertainty for the method. A noncomplying amenable cyanide result of 0.07 mg/kg could simply be the result of normal variance of the procedure.

The determination of amenable cyanide involves performing two cyanide analysis on different portions of the waste. In one portion a total cyanide is performed in accordance with the method. The second portion is first chlorinated to destroy cyanide, dechlorinated, and then another total cyanide is performed on the treated portion. Amenable cyanide is the difference between the total cyanide in the treated and untreated portions. Therefore, the estimates of uncertainty given previously would be compounded by the fact we are going through two analytical sequences not one.

ASTM Method D2036 "Test Method B - Cyanides Amenable to Chlorination By The Difference" makes the following precision statement for "selected water matrices".

$$ST = 0.20x + 0.009$$

Where ST = Overall sample standard deviation

and x = Cyanide concentration of sample, mg/l

We can apply this formula to an F006 waste with 100 mg/kg total cyanide. This is under the 110 proposed total cyanide limit.

$$ST = 0.20 (100 \text{ mg/kg}) + 0.009$$

$$ST = 20.009$$

Again compare this standard deviation of 20 mg/kg total cyanide to the proposed amenable cyanide limit of 0.062 mg/kg. Finally, realize that this amenable cyanide is the difference from two cyanide determinations. Without specific studies on the precision and accuracy of the cyanide method on solid matrices one cannot statistically defend any proposed amenable cyanide low limit.

000026

Northwestern Plating
February 9, 1989

Page 3

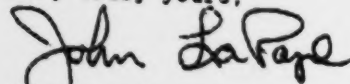
Laboratories use 20% relative percent difference as acceptance criteria for duplicates. This is used in the contract lab program. This means that values of 90 and 110 mg/kg total cyanide would be acceptable for duplicates on a single sample. With a difference of 20 mg/kg cyanide acceptable for duplicates, one can see that the method is not reliable enough to distinguish a 0.062 mg/kg difference between a treated and untreated (basically duplicates) portions of waste.

Data List:

Provided is a list of 88 F006 wastes and their cyanide data. Data is for total and, where performed, reactive cyanide. Reactive cyanide refers to weakly complexed cyanides liberated at a pH of 2.0 or higher. This data is from a variety of generators. We are assuming that these industries are all using cyanide in their processes, but we have not verified this by direct interviews. Of the 88 industries, 18 had total cyanides above the 110 mg/kg proposed total cyanide limit. We must emphasize that this 18% noncompliance may be biased low. Some of the data may be from industries not using cyanide in their processes.

We hope this information is useful to you. If you have questions regarding it or if we may be of further assistance, please contact me.

Very truly yours,



John R. LaPayne
Lab Manager

JL:js

Enclosure

cc: Kate Koening, Gene Matthews

000027

Cyanide Data

SAMPLE NUMBER: 807196
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 4.4
REACTIVE CYANIDE:

SAMPLE NUMBER: 806162
SAMPLE DESCRIPTION: F006 WASTE
TOTAL CYANIDE: 130
REACTIVE CYANIDE: 0.6

SAMPLE NUMBER: 807046
SAMPLE DESCRIPTION: WW FILTER CAKE
TOTAL CYANIDE: 48
REACTIVE CYANIDE: <0.4

SAMPLE NUMBER: 810137
SAMPLE DESCRIPTION: LAGOON SLUDGE
TOTAL CYANIDE: 31
REACTIVE CYANIDE: <0.44

SAMPLE NUMBER: 809057
SAMPLE DESCRIPTION: WASTE F006
TOTAL CYANIDE: 1,179
REACTIVE CYANIDE: 73

SAMPLE NUMBER: 807005
SAMPLE DESCRIPTION: WASTE FILTER C
TOTAL CYANIDE: 610
REACTIVE CYANIDE: 1.1

SAMPLE NUMBER: 807212
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 72
REACTIVE CYANIDE: <0.5

SAMPLE NUMBER: 810303
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: <0.29
REACTIVE CYANIDE:

SAMPLE NUMBER: 806098
SAMPLE DESCRIPTION: SLUDGE
TOTAL CYANIDE: 41
REACTIVE CYANIDE: <0.3

SAMPLE NUMBER: 910114

000028

SAMPLE DESCRIPTION: F006
TOTAL CYANIDE: 26
REACTIVE CYANIDE: 0.37

SAMPLE NUMBER: 804167
SAMPLE DESCRIPTION: HAZARDOUS WAST
TOTAL CYANIDE: <2.0
REACTIVE CYANIDE:

SAMPLE NUMBER: 806080
SAMPLE DESCRIPTION: WWT FILTER CAK
TOTAL CYANIDE: 260
REACTIVE CYANIDE: 2.4

SAMPLE NUMBER: 809485
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 52
REACTIVE CYANIDE: 0.78

SAMPLE NUMBER: 812242
SAMPLE DESCRIPTION: F006 FILTER CA
TOTAL CYANIDE: <0.27
REACTIVE CYANIDE:

SAMPLE NUMBER: 809339
SAMPLE DESCRIPTION: PLATING FILTER
TOTAL CYANIDE: 120
REACTIVE CYANIDE: 0.62

SAMPLE NUMBER: 810038
SAMPLE DESCRIPTION: PLATING FILTER
TOTAL CYANIDE: 940
REACTIVE CYANIDE: 2.0

SAMPLE NUMBER: 806225
SAMPLE DESCRIPTION: WW FILTER CAKE
TOTAL CYANIDE: 190
REACTIVE CYANIDE: 63

SAMPLE NUMBER: 704002
SAMPLE DESCRIPTION: ELECTROPLATING
TOTAL CYANIDE: 1.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 908499
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 1.7
REACTIVE CYANIDE:

000029

SAMPLE NUMBER: 807060
SAMPLE DESCRIPTION: PLATING SLUDGE
TOTAL CYANIDE: 0.52
REACTIVE CYANIDE:

SAMPLE NUMBER: 806135
SAMPLE DESCRIPTION: SLUDGE
TOTAL CYANIDE: 30
REACTIVE CYANIDE: <0.6

SAMPLE NUMBER: 802076
SAMPLE DESCRIPTION: WWT FILTER CAK
TOTAL CYANIDE: 1,300
REACTIVE CYANIDE: <0.16

SAMPLE NUMBER: 806238
SAMPLE DESCRIPTION: WWT FILTER CAK
TOTAL CYANIDE: 11
REACTIVE CYANIDE: <0.62

SAMPLE NUMBER: 806205
SAMPLE DESCRIPTION: IWT SLUDGE
TOTAL CYANIDE: <0.4
REACTIVE CYANIDE:

SAMPLE NUMBER: 811318
SAMPLE DESCRIPTION: FILTER CAKE
TOTAL CYANIDE: <0.25
REACTIVE CYANIDE:

SAMPLE NUMBER: 806112
SAMPLE DESCRIPTION: SLUDGE
TOTAL CYANIDE: 0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 812347
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: <0.33
REACTIVE CYANIDE:

SAMPLE NUMBER: 806201
SAMPLE DESCRIPTION: WWT FILTER CAK
TOTAL CYANIDE: <0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 811334
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 69
REACTIVE CYANIDE: <0.25

000030

SAMPLE NUMBER: 811008
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 0.43
REACTIVE CYANIDE: <0.31

SAMPLE NUMBER: 812348
SAMPLE DESCRIPTION: WASTEWATER SLU
TOTAL CYANIDE: 32.7
REACTIVE CYANIDE: <0.36

SAMPLE NUMBER: 812092
SAMPLE DESCRIPTION: F006
TOTAL CYANIDE: <0.29
REACTIVE CYANIDE:

SAMPLE NUMBER: 806223
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 22
REACTIVE CYANIDE: <0.4

SAMPLE NUMBER: 808092
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 0.34
REACTIVE CYANIDE:

SAMPLE NUMBER: 806151
SAMPLE DESCRIPTION: F006 SLUDGE
TOTAL CYANIDE: 17
REACTIVE CYANIDE: <0.7

SAMPLE NUMBER: 808219
SAMPLE DESCRIPTION: ELECTROPLATING
TOTAL CYANIDE: 24
REACTIVE CYANIDE: 0.42

SAMPLE NUMBER: 802084
SAMPLE DESCRIPTION: WWT FILTER CAK
TOTAL CYANIDE: 0.53
REACTIVE CYANIDE:

SAMPLE NUMBER: 806254
SAMPLE DESCRIPTION: METAL HYDROXID
TOTAL CYANIDE: 36
REACTIVE CYANIDE: <0.4

SAMPLE NUMBER: 807020
SAMPLE DESCRIPTION: NICKEL SLUDGE
TOTAL CYANIDE: 32
REACTIVE CYANIDE: 0.5

000031

SAMPLE NUMBER: 812318
SAMPLE DESCRIPTION: F006 SLUDGE
TOTAL CYANIDE: 49.4
REACTIVE CYANIDE: 4.1

SAMPLE NUMBER: 809249
SAMPLE DESCRIPTION: WWT FILTER CAK
TOTAL CYANIDE: 5.8
REACTIVE CYANIDE:

SAMPLE NUMBER: 807215
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 1.1
REACTIVE CYANIDE:

SAMPLE NUMBER: 806207
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 82
REACTIVE CYANIDE: 1.5

SAMPLE NUMBER: 808036
SAMPLE DESCRIPTION: PLATING SLUDGE
TOTAL CYANIDE: 33
REACTIVE CYANIDE: 0.4

SAMPLE NUMBER: 810387
SAMPLE DESCRIPTION: F006 SLUDGE
TOTAL CYANIDE: 40
REACTIVE CYANIDE: <0.42

SAMPLE NUMBER: 805205
SAMPLE DESCRIPTION: FILTER CAKE SL
TOTAL CYANIDE: <0.2
REACTIVE CYANIDE:

SAMPLE NUMBER: 807007
SAMPLE DESCRIPTION: WASTE SLUDGE
TOTAL CYANIDE: 330
REACTIVE CYANIDE: 0.8

SAMPLE NUMBER: 807073
SAMPLE DESCRIPTION: WWT FILTER CAK
TOTAL CYANIDE: <0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 806041
SAMPLE DESCRIPTION: WWT FILTER CAK
TOTAL CYANIDE: 2.8
REACTIVE CYANIDE:

000032

SAMPLE NUMBER: 801107
SAMPLE DESCRIPTION: PLATING SLUDGE
TOTAL CYANIDE: <0.2
REACTIVE CYANIDE:

SAMPLE NUMBER: 807113
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 26
REACTIVE CYANIDE: <0.4

SAMPLE NUMBER: 807132
SAMPLE DESCRIPTION: WET SLUDGE
TOTAL CYANIDE: <0.4
REACTIVE CYANIDE:

SAMPLE NUMBER: 806120
SAMPLE DESCRIPTION: FILTER CAKE WA
TOTAL CYANIDE: <0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 806150
SAMPLE DESCRIPTION: SLUDGE
TOTAL CYANIDE: 4.6
REACTIVE CYANIDE:

SAMPLE NUMBER: 811153
SAMPLE DESCRIPTION: F006 SLUDGE
TOTAL CYANIDE: 11.5
REACTIVE CYANIDE:

SAMPLE NUMBER: 811015
SAMPLE DESCRIPTION: FILTER CAKE
TOTAL CYANIDE: 16
REACTIVE CYANIDE: <0.56

SAMPLE NUMBER: 807238
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 2.6
REACTIVE CYANIDE:

SAMPLE NUMBER: 807238
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: 2.6
REACTIVE CYANIDE:

SAMPLE NUMBER: 810390
SAMPLE DESCRIPTION: WWT SLUDGE
TOTAL CYANIDE: <0.32
REACTIVE CYANIDE:

000033

SAMPLE NUMBER: 808197
SAMPLE DESCRIPTION: F006
TOTAL CYANIDE: 8.7
REACTIVE CYANIDE:

SAMPLE NUMBER: 80701
SAMPLE DESCRIPTION: MWT FILTER CAK
TOTAL CYANIDE: 12,200
REACTIVE CYANIDE: ~~0.34~~

SAMPLE NUMBER: 809450
SAMPLE DESCRIPTION: CHROME PLATING
TOTAL CYANIDE: <0.37
REACTIVE CYANIDE:

SAMPLE NUMBER: 804110
SAMPLE DESCRIPTION: PLATING SLUDGE
TOTAL CYANIDE: 41.0
REACTIVE CYANIDE:

SAMPLE NUMBER: 807079
SAMPLE DESCRIPTION: WASTEWATER TRE
TOTAL CYANIDE: 550
REACTIVE CYANIDE: <0.7

SAMPLE NUMBER: 806258
SAMPLE DESCRIPTION: WASTEWATER SLU
TOTAL CYANIDE: 370
REACTIVE CYANIDE: 0.5

SAMPLE NUMBER: 809475
SAMPLE DESCRIPTION: WASTEWATER FIL
TOTAL CYANIDE: 0.46
REACTIVE CYANIDE:

SAMPLE NUMBER: 810306
SAMPLE DESCRIPTION: CHROME HYDROXI
TOTAL CYANIDE: 120
REACTIVE CYANIDE: ~~<0.44~~

SAMPLE NUMBER: 806124
SAMPLE DESCRIPTION: ZINC FILTER CA
TOTAL CYANIDE: <0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 803019
SAMPLE DESCRIPTION: PLATING SLUDGE
TOTAL CYANIDE: <0.16
REACTIVE CYANIDE:

000034

SAMPLE NUMBER: 805231
SAMPLE DESCRIPTION: WASTEWATER TRE
TOTAL CYANIDE: 19
REACTIVE CYANIDE: <0.3

SAMPLE NUMBER: 807112
SAMPLE DESCRIPTION: COPPER HYDROXI
TOTAL CYANIDE: 12
REACTIVE CYANIDE: <0.4

SAMPLE NUMBER: 804108
SAMPLE DESCRIPTION: FILTER CAKE
TOTAL CYANIDE: <0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 806118
SAMPLE DESCRIPTION: WASTEWATER FIL
TOTAL CYANIDE: 0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 811021
SAMPLE DESCRIPTION: F006
TOTAL CYANIDE: 0.65
REACTIVE CYANIDE:

SAMPLE NUMBER: 806242
SAMPLE DESCRIPTION: F006
TOTAL CYANIDE: <0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 807070
SAMPLE DESCRIPTION: ZINC HYDROXIDE
TOTAL CYANIDE: 81
REACTIVE CYANIDE: <0.3

SAMPLE NUMBER: 807111
SAMPLE DESCRIPTION: WASTEWATER FIL
TOTAL CYANIDE: 11,700
REACTIVE CYANIDE: 55

SAMPLE NUMBER: 808075
SAMPLE DESCRIPTION: SLUDGE
TOTAL CYANIDE: 0.33
REACTIVE CYANIDE:

SAMPLE NUMBER: 808217
SAMPLE DESCRIPTION: WASTEWATER FIL
TOTAL CYANIDE: 750
REACTIVE CYANIDE: 0.93

000035

SAMPLE NUMBER: 807064
SAMPLE DESCRIPTION: WASTEWATER FIL
TOTAL CYANIDE: 1.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 803015
SAMPLE DESCRIPTION: SOLIDIFIED PLA
TOTAL CYANIDE: 2.1
REACTIVE CYANIDE:

SAMPLE NUMBER: 804068
SAMPLE DESCRIPTION: WASTEWATER SLU
TOTAL CYANIDE: 3.7
REACTIVE CYANIDE:

SAMPLE NUMBER: 806203
SAMPLE DESCRIPTION: FILTER CAKE
TOTAL CYANIDE: <0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 808037
SAMPLE DESCRIPTION: NICKEL CHROME
TOTAL CYANIDE: <0.24
REACTIVE CYANIDE:

SAMPLE NUMBER: 807067
SAMPLE DESCRIPTION: SLUDGE
TOTAL CYANIDE: 110
REACTIVE CYANIDE: <0.4

SAMPLE NUMBER: 804067
SAMPLE DESCRIPTION: WASTEWATER SLU
TOTAL CYANIDE: <0.3
REACTIVE CYANIDE:

SAMPLE NUMBER: 806078
SAMPLE DESCRIPTION: WASTEWATER FIL
TOTAL CYANIDE: 2.7
REACTIVE CYANIDE:

SAMPLE NUMBER: 806122
SAMPLE DESCRIPTION: FILTER PRESS S
TOTAL CYANIDE: 680
REACTIVE CYANIDE: <0.4

SAMPLE NUMBER: 806095
SAMPLE DESCRIPTION: FILTER CAKE
TOTAL CYANIDE: 3.7
REACTIVE CYANIDE:

000036

Sample No.	Total Cyanide	Relative Cyanide	Cyanide Plating	Alk Cl Other
80701	12200	0.34	YES	?
807111	11700	55	YES	ALK
802076	1300	0.16	YES	NONE
809057	1179	23	YES	ALK
810038	940	2	YES	ALK
808217	730	0.93	YES	ALK
806122	688	0.4	YES	ALK
807005	610	1.1	YES	ALK
807079	550	0.7	YES	CONV.
806258	370	0.5	YES	ALK
807007	330	0.8	YES	ALK
806380	260	2.4	YES	ALK
806225	190	63	YES	ALK
806162	150	0.6	YES	ALK
809339	120	0.62	YES	ALK
810306	120	0.44	YES	ALK
807047	110	0.4	YES	EVAP
Data below indicates some Cyanide plating on steel substrates				
806207	82	1.5	YES	ALK
807070	81	0.3	YES	ALK
807212	72	0.5	YES	ALK
811334	69	0.25	YES	ALK
809405	52	0.78	YES	ALK
812318	49.4	4.1	YES	?
807046	48	0.4	YES	OTHER
806098	41	0.3	YES	?
810387	40	0.42	YES	ALK
806254	36	0.4	YES	ALK
808036	33	0.4	YES	ALK
812345	32.7	0.36	YES	ALK
807020	32	0.5	YES	?
810137	31	0.4	YES	ALK
806135	30	0.6	YES	ALK
807113	26	0.4	YES	ALK
810114	26	0.37	YES	ALK
808219	24	0.42	YES	ALK
806273	22	0.4	YES	ALK
805231	19	0.3	YES	ALK
811015	16	0.56	YES	?
807112	12	0.4	YES	ALK
811153	11.5		YES	NO
806238	11	0.62	YES	ALK
809249	5.8		YES	ALK
807196	4.4		YES	ALK
804068	3.7		YES	ALK
806095	3.7		YES	ALK
806041	2.8		YES	RECLAIM
807064	1.3		YES	NO
Data below indicates very little Cyanide plating on steel				
804110	1		YES	ALK
811021	0.65		YES	NO
810390	0.32		YES	ALK
805205	0.2		YES	ALK
803019	0.16		YES	ALK
Data points below represent no Cyanide usage				
806151	17	0.7	NO	
808197	5.7		NO	
806150	4.6		NO	
806078	2.7		NO	
807238	2.6		NO	
803015	2.1		NO	
804167	2		NO	
808099	1.7		NO	
704002	1.3		NO	
807215	1.1		NO	
802084	0.53		NO	
807060	0.52		NO	
809475	0.44		NO	
811008	0.43	0.31	NO	
806205	0.4		NO	
807132	0.4		NO	
809450	0.37		NO	
808092	0.34		NO	
808075	0.33		NO	
812347	0.33		NO	
804067	0.3		NO	
804108	0.3		NO	
806117	0.1		NO	

000037

Sample No.	Total Cyanide	Reactive Cyanide	Cyanide Plating	Alk Cl Other
804118	0.3		NO	
804120	0.3		NO	
804124	0.3		NO	
804201	0.3		NO	
804203	0.3		NO	
804242	0.3		NO	
807073	0.3		NO	
810363	0.29		NO	
812042	0.29		NO	
812242	0.27		NO	
811318	0.25		NO	
808037	0.24		NO	
801107	0.2		NO	

000038



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00024.8

Appendix II.

Craftsman Plating & Tinning Corp.

1250 W. Melrose Street, Chicago, Illinois 60657 — 312/477-1040

FEB 27 1989

February 20, 1989

Mr. Mark Griffiths
Director of Government Relations
National Association of Metal Finishers
Suite 700
1101 Connecticut Avenue, N.W.
Washington, DC 20036

RE: February 27, 1989 Comments on EPA's Proposed
Rule on Land Disposal Restrictions for
Cyanide Bearing Wastes

Dear Mark:

Craftsman Plating & Tinning Corporation cannot possibly comply with EPA's proposed rules on cyanide. Although Craftsman is an exemplary facility using the most current and effective technology available to our industry, its total cyanide numbers are approximately twenty (20) times higher than those proposed by EPA.

The following facts are pertinent to support my feeling that EPA's proposal is unachievable by many well-run electroplating facilities.

- A. Craftsman Plating & Tinning Corporation was one of the supposed "well-designed & well operated" facilities used to establish the total cyanide and amenable cyanide limits for the Electroplating Point Source Category under the Clean Water Act. (See attached pages of the Development Document for Existing Source Pretreatment Standards For The Electroplating Point Source Category, August 1979 EPA Document #440/1-79/003). Craftsman is identified in this document as plant #4.
- B. Craftsman has 17,675 gallons of electroplating solutions of which 8840 gallons are cyanide plating solutions - 50.01%.

Of the 8840 gallons, 3640 gallons are plated out of rubberlined or fiberglass tanks - 63.80%.

Only 18.10% of the plated parts are processed in steel tanks with cyanide as the electrolyte.

000039

Mr. Griffiths
February 20, 1989
Page Two

Therefore, every attempt technically possible is being made to reduce the generation of complex ferro cyanides in the electroplating processes.

- C. Although the volume of cyanide plating solutions is only 50.01% of the total plating solutions used at Craftsman, dollar sales generated by the processes using cyanide plating represents over 67% of total sales.

Best estimate of the percentage of steel parts processed in cyanide plating would be a minimum of 55% of total sales, or 83% of cyanide sales.

- D. As B and C above indicate, an inherent amount of Craftsman's business is cyanide plating on steel. If the conclusion can be drawn from A above that Craftsman operates a well-designed and well-operated pretreatment system, then the cyanide content found in its sludge must be reasonable for its operation.

Two recent sludge analyses indicated that total cyanides of around 2000 ppm would not be unusual. Reactive or Free Cyanides of 30 ppm are also to be expected. (I am not qualified to discuss the analytical ability to measure amenable, reactive, free, etc. cyanides on sludges by using wastewater techniques, but EPA should pursue that with the laboratories). See attached reports.

- E. Additional data regarding Craftsman's operation can also be gleaned by looking at EPA's Form Rs.

Attached Form R for Cyanide Compounds discharged by Craftsman in 1987 indicated that 310 pounds of cyanide was discharged to the POTW and 32 pounds to a secure landfill. Form R for 1988 will show a reduction of cyanide to the POTW, but a significant increase in the amount of cyanide shipped to the secure landfill.

Although the total volume released to the environment remained consistent based on production volumes, the continued fine tuning of the pretreatment system (including alkaline chlorination) resulted in lower discharges to the POTW but increased amounts of complex cyanides in the filter cake. In 1987, the cyanide discharges to the POTW averaged 0.745 ppm, in 1988 0.37 ppm. The 50% improvement in the wastestream translated into a 412% increase in cyanide levels in the sludge.

000040

Mr. Griffiths
February 20, 1989
Page Three

Mark, I would appreciate it if NAMP would submit my personal comments to EPA on this matter. I do not consider my comments as a criticism of EPA so much as an indication that EPA needs additional data on F006 sludges.

If I can be of any further assistance, please contact me.
Sincerely,

James B. Blacklidge
President
Craftsman Plating & Tinning Corporation

JBB/kmb

Enclosure

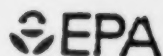
000041

United States
Environmental Protection
Agency

Effluent Guidelines Division
JWW 552
Washington, DC 20460

LD10-00024.B

228-000-10-000
August 1979



Development
Document for
Existing Source
Pretreatment
Standards for the

Final

Electroplating

Point Source Category

000042

SECTION XII:

PRETREATMENT

TECHNICAL APPROACH

Pretreatment standards for electroplating were developed in the following manner. The point source category was first studied for the purpose of determining whether separate standards were appropriate for different segments within the category. The raw waste characteristics of each segment were then identified. This included an analysis of the source, flow, and volume of water used in the process employed; the sources of waste and waste waters in the operation, and; the constituents of all waste water. The compatibility of each raw waste characteristic with municipal treatment works was considered. Waste water constituents posing pass-through or interference problems for POTWS were identified.

The control and treatment technologies appropriate to each segment were also identified, including both existing in-plant and end-of-process technologies as well as those capable of being designed for each segment. The effluent level resulting from the application of each of the technologies, in terms of the amount of constituents and the chemical, physical, and biological characteristics of pollutants, was also identified. The problems, limitations, and reliability of each treatment and control technology were determined next. In addition, the nonwater quality environmental impact, such as the effects of the application of such technologies upon other pollution problems i.e., air, solid waste, noise, and radiation, were evaluated. Finally, the energy requirements of each control and treatment technology were determined, as well as the cost of the application of such technologies.

The information, as outlined above, was then evaluated to find the appropriate level of effluent pretreatment given the total cost of application of the technology, the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, nonwater quality environmental impact (including energy requirements), and other factors.

The data upon which the above analyses were performed included EPA permit applications, EPA sampling and inspections, consultant reports, and industry submissions.

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STATISTICAL METHODOLOGY

This section provides an overview of statistical methodologies employed to determine pretreatment standards for the electroplating industry. The methodology consisted essentially of determining long term average pollutant discharges, expected from a well designed and operated pretreatment system, and multiplying these long term averages by variability factors designed to allow for random fluctuations in treatment system performance. The resulting products yielded daily and 30-day-average maximum limitations for each pollutant. A simple, approximate equation was employed to obtain N-day-average maximum limitations for $N = 2, 3, \dots, 29$. Modifications of this procedure were made to accommodate mass-based and TSS options. The general statistical derivation of long term averages, variability factors, and the resulting limitations follows.

Determination of Long Term Average

The long term average (LTA) is the expected discharge concentration of a pollutant in mg/l from an electroplating plant having a well designed, maintained, and operated pretreatment system. The long term average was determined for each pollutant to be regulated, and used to obtain corresponding limitations for that pollutant. It is not intended as a limitation itself, but rather as a specification which the pretreatment system should be designed to attain over the long term.

For the analyses on hexavalent chromium and cyanide and the metals plated in the Electroless and Printed Circuit Board subcategories, the long term average was calculated as the median of the plant averages for each of these pollutants.

Determination of Variability Factors

Even plants that are achieving good pollutant removal experience fluctuations in the discharge pollutant concentrations from their pretreatment system. These fluctuations may reflect temporary imbalances in the treatment system caused by fluctuations in flow, raw waste load of a particular pollutant, chemical feed, mixing flows within tanks, or a variety of other factors.

Allowance for the day-to-day variability in the concentration of a pollutant discharged from a well designed and operated treatment system is incorporated into the standards by the use of a "variability factor." The theoretical derivation of the variability factor is presented in Appendix XII-A.1. Under certain assumptions, discussed below, the application of a variability factor allows the calculation of an upper bound for the concentration of a particular pollutant such that in expectation 99 percent of the randomly observed daily values

from a pretreatment system discharging this pollutant at a known mean concentration will fall below this bound.

The theoretical derivation of the variability factor is based on the assumption that the daily pollutant concentrations follow a lognormal distribution. This assumption is supported by test statistics (Kuiper and Kolmogorov-Smirnov, not reported here), plots of the cumulative distribution of observed concentrations for various pollutants as shown later, and comparisons of variability factors estimated from plant data by two theoretically equivalent formulas (Appendix XII-A.3).

The variability factor is estimated by the equation derived in Appendix XII-A.1, which is:

$$\log(VF) = Z \cdot \text{Sigma} - 1.15(\text{Sigma})^2 \quad (1)$$

where

VF is the variability factor

Z is 2.326, which is the 99 percentile of the standard normal distribution, and

Sigma is the standard deviation of the logarithms (base 10) of the concentrations.

The accuracy of the variability factor is a function of the accuracy of Sigma, the standard deviation of the logarithm of the observations of a well designed and well operated plant. Important considerations for assessing the accuracy of Sigma include:

1. the randomness of the concentrations sampled for each plant,
2. the number and accuracy of the daily samples per plant,
3. the number and appropriateness of the plants included in the sample, and
4. the assumption that the daily pollutant concentrations follow a lognormal distribution.

The last consideration has been discussed above. The methodology for obtaining Sigma, and thus VF, takes into consideration the first three factors.

The estimated single-day variability factor of a pollutant from a well designed and operated plant was calculated in the following manner:

1. For each plant: with 10 or more but less than 100 observations and a small number of 0 values: for the pollutant, Sigma was calculated according to the standard statistical formula: and was then substituted into Equation (1) to find the VF.
2. For those plants with over 100 observations, the VF was estimated directly by dividing the 99th percentile of observed sample values by the average of the observations.
3. The VF for each pollutant was then calculated to be the median of the plant variability factors for that pollutant.

Allowance for the variability of the average of a random sample of N daily observations about the mean value of a pollutant discharged from a well designed and operated pretreatment system was obtained by use of a theoretically derived term (Appendix XII-A.2, called the "N-day-

Plants with both high and low average concentrations fulfilling the stated conditions were included in the data base to calculate the variability factors. This was done since Appendix XII-A.4 showed that the sample means and standard deviations of the logarithms of the concentrations of a specific pollutant for each plant were not significantly correlated across plants, i.e., standard deviations from plants with high average concentration were not significantly larger than standard deviations from plants with low average concentrations for each pollutant. This is consistent with the assumption of lognormality.

Only 7 of 68 cases observed effluent concentrations of 0 and these never represented more than 25% of the observations. Since log 0 is undefined, the 0 values were set equal to one-half the next lowest pollutant concentration. This was found to have little effect on the results and in six of the above seven cases, the individual variability factors were greater than the median variability factor.

$$s = \frac{(\bar{x} - x)^2}{n-1}$$

where

- x is the log of observation i
- $\bar{x}$ is the average of the observations
- n is the number of observations

average variability factor." This term allows the calculation of an upper bound for the concentration of a particular pollutant under the same assumptions stated above such that in expectation 99 per cent of the randomly observed N-day average values from a pretreatment system discharging the pollutant at a known mean concentration will fall below this bound. Thirty-day average variability factors are reported in all analyses.

The N-day-average variability factor was estimated by a theoretically based equation (Appendix XII-A.2).

$$\log(VF) = Z(\Sigma) - 1.15(\Sigma)^2 \quad (2)$$

where

VF is the N-day-average variability factor

Z is 2.326, which is the 99th percentile of the standard normal distribution, and

Σ is a function of Sigma and N.

Sigma can be obtained from the estimate of the (daily) variability factor, VF, as outlined in Appendix XII-A.2. This is a departure from the Monte Carlo simulation used to calculate this term in the previous Development Document for proposed electroplating pretreatment regulations.

Determination of Limitations

Daily maximum and 30-day-average maximum limitations (L and L_{30} , respectively) were calculated for each pollutant from the long term average (LTA), the daily variability factor (VF), and the 30-day-average variability factor (VF_{30}) for that pollutant by the following equations:

$$L = VF \times LTA \quad (3)$$

$$L_{30} = VF_{30} \times LTA \quad (4)$$

The daily maximum limitation calculated for each pollutant is a value which is not to be exceeded on any one day by a plant discharging that pollutant. The 30-day-average maximum limitation is a value which is not to be exceeded by the average of any 30 single-day observations for the regulated pollutant.

TREATMENT OF CYANIDE

The distinction between amenable cyanide (CN,A) and total cyanide (CN,T) stems from the chemical form of the cyanide in the waste stream. Much of the cyanide-containing waste enters the treatment system as a free ion, or in the form of complexes with Cu, Zn, Cd, or Pb. Such cyanide is rapidly oxidized to cyanate in the first stage of an alkaline chlorination treatment system, and falls into the category, CN,A. Under some circumstances, a portion of the cyanide may be present as iron or other heavy metal cyanide complexes. Since these compounds are much more difficult to oxidize than free cyanide, their formation should be avoided or minimized by careful attention to proper housekeeping practices previously discussed.

Technologies for treating cyanide were described in detail in Chapter VII.

Calculation of the Long Term Average for Amenable Cyanide (CN,A)

The destruction of CN,A by alkaline chlorination is a kinetically rapid reaction. A plant with an adequately sized and controlled treatment unit followed by pH adjustment and settling should achieve nearly complete removal of CN,A. This can be seen from the data in Table 12-1. Of the 46 plants with data summarized in this table, 15 (32%) reduced the average CN,A to 0.01 mg/l or less.

The plants described in Table 12-1 are those which: (a) plate Cu, Cd, Zn, or precious metals; (b) have an oxidation system to treat their CN wastes; and (c) have CN,A concentration data. An effort has been made to make Table 12-1 as complete as possible, by including all appropriate CN,A data from the data base compiled for analysis by this Agency from those plants plating the appropriate metals and having oxidation treatment.

However, certain plants were found inappropriate and were thus eliminated from the data base for CN,A long-term calculations. Among these were: (a) three plants (6078, 19002, 33071) with cyanide destruct systems which were not operating properly or which were partially bypassed; (b) six plants (6050, 6053, 6077, 6087, 6352, 19051) with lancy or integrated pretreatment systems, and; (c) five plants (6051, 6079, 6081, 19050, 36040) specified as having low cyanide bearing wastes.

Figure 12-1 is a cumulative plot of the average CN,A concentrations in the effluent from the 46 plants shown in Table 12-1. The plot shows that 21% of the plants removed essentially all amenable cyanide down to CN,A less than or equal to 0.01 mg/l, and also shows that many of the remaining plants, although not reaching this low level, still

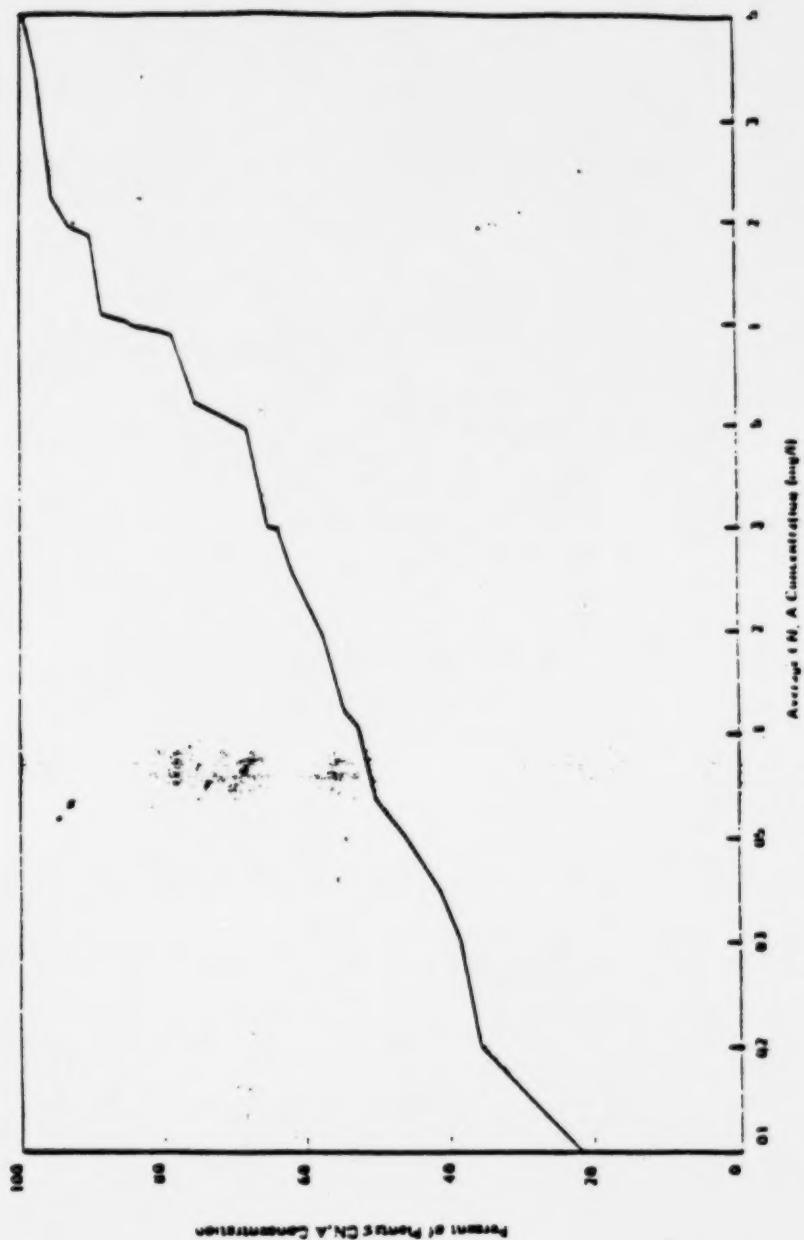


FIGURE 12.1

CUMULATIVE PERCENT OF AVERAGE CNA IN INDIVIDUALS FROM 4 PLANTS

TABLE 12-1

CN,A CONCENTRATIONS OBSERVED IN THE FINAL EFFLUENT FROM PLANTS
WITH CYANIDE OXIDATION IN WASTE TREATMENT SYSTEM

Plant ID	Water Source	Number Cys.	Concentration CN,A		
			Median	Avg.	Max.
4	.	1	0.04 mg/l	0.04 mg/l	0.05 mg/l
6	.	1	.32	.32	.32
7	.	2	.25	.25	.25
8	.	1	.80	.80	1.00
15	.	1	.50	.31	.90
19	.	1	.42	.56	.40
116	.	1	.01	.01	.01
478	.	1	.06	.06	.08
552	.	1	.01	.01	.01
804	.	1	.01	.02	.03
1103	.	1	.49	.62	.90
1113	.	1	.01	.14	.68
1924	3	1	.03	.07	.17
2001	3	114	.04	.04	.06
2007	3	2	.02	.02	.03
2103	3	13	.01	.01	.03
3301	.	4	.01	.02	.02
3320	.	1	.02	.02	.02
3601	.	1	.01	.01	.01
4045	.	3	1.00	1.15	2.20
5021	4	3	.01	.01	.01
6037	4	1	.41	4.04	11.69
6072	4	2	.01	.01	.01
6073	4	3	1.46	2.24	3.98
6075	4	2	.01	.01	.01
6084	4	1	1.97	1.97	1.97
6085	4	3	.56	.57	1.09
6089	4	3	.29	.53	1.11
6381	4	3	.10	.31	.75
9026	4	3	.01	.02	.03
10020	4	3	4.40	5.30	7.30
15070	4	3	.01	.01	.02
20073	4	6	.01	.02	.03
20077	4	6	.39	.98	3.00
20078	4	6	.01	.01	.01
20079	4	6	.01	.01	.01
20080	4	7	.01	.03	.10
20081	4	6	.02	.13	.49

(continued on next page)

TABLE 12-1 (Continued)

Plant ID	Data Source	Number Obs.	Concentration CN.A		Max.
			Median	Avg.	
20082	4	3	.79 mg/l	.96 mg/l	3.00 mg/l
20084	4	3	1.23	1.23	2.30
20086	4	3	.36	1.87	5.23
20087	4	3	.66	.49	.80
31021	4	3	.05	.05	.05
33024	3 5 4	3	.04	.05	.08
33073	4	3	.02	.02	.03
36041	4	3	.10	.20	.40

*1 = Data from reports by Yost et al., and Safranek et al.

2 = Battelle

3 = Plant

4 = Hamilton Standard.

achieved fairly good CN,A removal. The median or long term average value for CN,A was .07 mg/l.

In some plants, the cause of high effluent CN,A concentrations appeared to be poor design or control of the treatment system. For instance, sampling personnel, although not specifically instructed to evaluate the design or operation of plant treatment systems during sampling visits, noted potential design flaws (4045, 10020, 20084), a history of chlorine feed malfunctions (6073), and spillage to streams of untreated cyanide bearing solutions (20086).

Calculation of the Long Term Average for Total Cyanide (CN,T)

Table 12-1 presents comparable data for 65 plants with cyanide wastes, oxidation treatment, and CN,T measurements. Figure 12-1 is a cumulative plot of the average CN,T values for these plants. A comparison of Figure 12-1 and 12-2 shows them to be similar in form. In both cases, a substantial fraction of the plants achieved nearly complete cyanide removal: 14 percent of the Figure 12-1 plants experienced average CN,T effluent concentrations of less than 0.04 mg/l, with the median value or long term average being 0.15 mg/l.

The plants deleted from the CN,A analysis were also eliminated from the CN,T analysis for the same reasons given above. Also, three plants (1017, 1311, 1311) were eliminated from the analysis in Table 12-2 because they combined waste waters from other types of operations. Additionally, the reported data from plants 689, 1101, and 4101 were deleted as suggested by industry commenters due to nonstandard analytical techniques.

Calculation of the Variability Factors

As Tables 12-1 and 12-2 show, even plants achieving good cyanide removal occasionally experience a day of higher than usual cyanide discharge. To allow for these fluctuations, variability factors were calculated as outlined in the section on statistical methodology. The calculation of this variability was based on the observation that in this industry, as in many industries, the discharge concentrations of metal and cyanide follow a standard lognormal statistical distribution. Figure 12-3 shows a cumulative plot, on a log probability scale, of 24 daily observations of CN,T from plant number 1120. The data fall nearly along a straight line, indicating that the distribution of observations from this plant may indeed be assumed consistent with lognormality. Figure 12-4 is a cumulative plot of the CN,A data furnished for plant 1108. The points in this figure again fall along a straight line, indicating that this sample also conforms to lognormality.



TABLE 12-2

CN,T CONCENTRATIONS OBSERVED IN THE FINAL EFFLUENT FROM
PLANTS WITH CYANIDE OXIDATION IN WASTE TREATMENT SYSTEMS

Plant ID	Data Source	Number Obs:	Concentration CN,T		
			Median	Avg.	Max.
6	1	2	.25 mg/l	.25 mg/l	.38 mg/l
7	1	2	16.72	16.72	31.80
8	1	2	.45	.45	.59
15	1	2	14.00	14.00	16.00
19	1	11	1.30	2.65	12.00
116	3	37	.78	.80	1.60
478	3	3	.01	.12	2.22
607	6 3	3	.25	.31	.61
629	3	3	.12	.11	.16
652	3	3	.07	.07	.07
662	3	3	.01	.01	.01
805	6 3	21	.30	.36	.96
902	3	6	nil	nil	.05
1108	3	13	nil	nil	nil
1113	3	9	1.00	1.38	4.00
1165	3	2	.05	.21	.78
1208	3	37	.06	.06	.12
1209	3	1	.10	.15	.92
1261	3	1	.03	.03	.03
1302	3	1	.01	.01	.01
1924	1	3	1.00	1.00	1.00
2006	3	7	.01	.86	3.20
2007	3	2	.02	.02	.08
2103	3	44	.02	.02	.03
2303	3	1	.02	.02	.04
2501	3	13	.20	.20	.20
2909	3	1	nil	nil	.03
3003	3	1	.01	.01	.01
3005	3	1	.01	.01	.01
3021	3	7	.05	.05	.05
3301	3	6	.03	.03	.07
3311	3	25	nil	.07	1.60

(continued on next page)

TABLE 12-2 (Continued)

Plant ID	Data Source	Number Obs:	Concentration CN.T		
			Median	Avg.	Max.
3315	2 & 3	7(m)	4.30 mg/l	4.25 mg/l	9.90 mg/l
3320	2 & 3	26	.01	.02	.15
3601	2 & 3	2	.03	.03	.03
3612	2	39	.02	.02	.02
4045	2	3	8.70	10.10	15.20
5021	2	3	.01	.01	.01
6037	2, 3, & 4	11	.53	.01	.01
6072	2	2	.01	1.62	12.60
6073	2	3	.01	.01	.01
6075	2	3	3.08	3.29	5.13
6084	2	3	.01	.01	.01
6085	2	3	.44	1.09	2.80
6089	2	3	.95	1.23	1.30
6181	2	3	.41	1.04	2.42
9025	2	3	.06	.38	.98
10020	2	3	.03	.04	.08
15070	2	3	5.30	5.70	7.40
20073	2	3	.03	.11	.29
20077	2	6	.08	.12	.37
20078	2	6	2.20	1.90	3.00
20079	2	6	.01	.01	.04
20080	2	6	.01	3.51	21.00
20081	2	7	.01	.23	1.22
20082	2	8	.07	.87	1.82
20084	2	2	.83	1.47	3.31
20086	2	3	34.70	34.70	50.50
20087	2	3	1.13	2.37	5.25
31021	2	3	3.50	18.36	50.00
33024	2 & 4	15	.16	.25	.35
33070	2	3	nil	.01	.08
33073	2	3	.07	.07	.10
36041	2	3	.13	.13	.25
		3	.40	.42	.60

1 = Data from reports by Yost et al., and Safranek et al.
 2 = Satellite
 3 = Plant
 4 = Hamilton Standard
 m = Monthly average data.

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Craftsman Plating
Page Two

Lab No. 1-183
November 4, 1988

The sample was leached in accordance with 40 CFR, Part 261, Appendix III

B. <u>HEAVY METALS (mg/Kg)</u>	<u>TOTAL</u>	<u>E.P. TOXICITY</u>	<u>TCLP</u>
Silver	1.2	--	--
Arsenic	27.4	--	9.05
Barium	0.4	--	--
Cadmium	26.000	--	--
Chromium	1.750	5.0	450.
Copper	13.000	5.0	3.1
Mercury	0.93	--	--
Nickel	97.1	--	--
Lead	621	5.3	--
Selenium	0.9	5.3	--
Zinc	44.000	--	0.7
Thallium	12.1	1.000	--
Iron	8.900	--	--
Hexavalent Chromium	--	--	--
OTHER: _____	_____	_____	_____

Final pH of E.P. Toxicity extraction:

5.80

C. <u>INORGANIC COMPONENTS (mg/Kg)</u>	
Total Cyanide	2.250
Free Cyanide	10.8
Sulfide	0.2
Disulfide	0.1 0
Sulfite	0.1 0
Phenol	0.1 0
PCB's	0.1 0
Load Bearing Capacity	0.1 0
Free Liquid (Paint Filter Test)	50 kg/cm ²
	Negative

000055

Respectfully submitted,

SCIENTIFIC CONTROL LABORATORIES, INC.

By *Frank A. Mayes*
Frank A. Mayes

1158 S. KOLIN AVENUE • CHICAGO, ILLINOIS 60623-4879 • (312) 254-2406



Craftsman Plating & Tinning Corporation
Page Two

Lab No: 9-061
August 25, 1988

3. HEAVY METALS (mg/Kg)

	<u>TOTAL</u>	<u>TCLP</u>
Silver	*0.5	*0.01
Arsenic	11.7	*2.1
Barium	*1.0	N.R.
Cadmium	11,600.	125.
Chromium	2,425.	3.4
Copper	5,165.	90.0
Lead	*0.1	N.R.
Mercury	27.2	2.8
Nickel	578.	1.8
Seal	*1.0	N.R.
Selenium	13,365.	510.
Vanadium	*0.5	N.R.
Zinc	7,385.	N.R.
Iron	---	---

4. INORGANIC COMPONENTS (mg/Kg)

Total Cyanide	1.740.
Free Cyanide	29.8
Sulfide	*2.0
Nitrate	*1.0
Nitrite	*1.0
Phenol	*1.0
PCB's	*1.0
Load Bearing Capacity	*0.25 kg/cm ²
Free Liquid (Paint Filter Test)	NEGATIVE

* Denotes "LESS THAN" (Below detectable limit of procedure used)
N.R. = Not Required

000056

Respectfully submitted,

SCIENTIFIC CONTROL LABORATORIES, INC.

By *Frank Altmayer*
Frank Altmayer

PA:lls
10

2058 S. KOLIN AVENUE • CHICAGO, ILLINOIS 60623-4889 • (312) 254-2406



TYPE OF PRINT: Read instructions before completing form.

Page 1 of 1

EPA FORM R
PART III. CHEMICAL SPECIFIC INFORMATION

CHEMICAL IDENTITY

☐ Trade Secret (Provide a generic name in 1.4 below. Attach substantiation form to this submission.)
CAS # NA (Use leading zeros if CAS number does not fill space provided.)

Chemical or Chemical Category Name

Cyanide Compounds

Provide Chemical Name (Complete only if 1.1 is checked.)

MIXTURE COMPONENT IDENTITY (Do not complete this section if you have completed Section 1.1.)
General Chemical Name Provided by Supplier (Limit the name to a maximum of 70 characters (e.g., numbers, letters, spaces, punctuation).)

ACTIVITIES AND USES OF THE CHEMICAL AT THE FACILITY (Check all that apply.)

- Manufacture: a. ☐ Produce b. ☐ Import c. ☐ For on-site use/processing
d. ☐ For sale/distribution e. ☐ As a byproduct f. ☐ As an impurity
Process: a. ☐ As a reactant b. ☐ As a formulation component c. ☐ As an article component
d. ☐ Repackaging only
Otherwise Used: a. ☒ As a chemical processing aid b. ☐ As a manufacturing aid c. ☐ Auxiliary or other use

MAXIMUM AMOUNT OF THE CHEMICAL ON SITE AT ANY TIME DURING THE CALENDAR YEAR
212 (enter code)

RELEASES OF THE CHEMICAL TO THE ENVIRONMENT

may report releases of less than 100 lbs. by checking ranges under A.1.

		A. Total Release (lb/yr)				B. Basis of Estimate (enter code)	
		A.1 Reporting Range		A.2 Enter Estimate			
		0-100	100-1000				
- May report releases of less than 100 lb. by checking ranges under A.1.							
Fugitive or non-point air emissions		5.1a				NK	5.1b ☐
Stack or point air emissions		5.2a				NK	5.2b ☐
Discharges to water		5.3a				NA	5.3.1b ☐
Enter water code from Part I Section 1.10 or Appendix (01-1)		5.3.1a				NA	5.3.1b ☐
		5.3.2					5.3.2b ☐
		5.3.3					5.3.3b ☐
Underground injection		5.4a				NA	5.4b ☐
Releases to land		5.5.1a				NA	5.5.1b ☐
5.5.1 ☐ ☐ (enter code)		5.5.2a					5.5.2b ☐
5.5.2 ☐ ☐ (enter code)		5.5.3a					5.5.3b ☐
5.5.3 ☐ ☐ (enter code)							

(Check if additional information is provided in Part IV-Substantiated Information.)

EPA Form 2250-1(11-88)

000057

EPA FORM R, Part III (Continued)

ANSWERS OF THE CHEMICAL IN WASTE TO OFF-SITE LOCATIONS

Page 4 of 5

You must report transfers of less than 1,000 lbs. by operating ranges under A.1.

		A. Total Transfers (lb/yr)		B. Basis of Estimate (enter code)	C. Type of Treatment/Disposal (enter code)
		A.1 Reporting Ranges 0 1-999 1000-9999	A.2 Error Estimate		
5.1	Discharge to POTW			6.1b	N
5.2	Other off-site location (Enter basis number from Part I, Section 2.1)		310	6.2b	N
5.3	Other off-site location (Enter basis number from Part I, Section 2.1)		32	6.3b	
5.4	Other off-site location (Enter basis number from Part I, Section 2.1)			6.4b	

312/477-1040

FAX 312/477-4996

WASTE TREATMENT M
A. General Wastestream (enter code)

7.1a 7.1b

7.2a 7.2b

7.3a 7.3b

7.4a 7.4b

7.5a 7.5b

7.6a 7.6b

7.7a 7.7b

7.8a 7.8b

7.9a 7.9b

7.10a 7.10b

7.11a 7.11b

7.12a 7.12b

7.13a 7.13b

7.14a 7.14b

CYANIDE

1987

1988

POTW

3108

948

SLUDGE

328

1648

WASTEWATER

0.745 ppm

0.37 ppm

MASS BALANCE

3428

2588

MASS BALANCE CHANGE

24.6%



Craftsman Plating & Tinning Corp.

312/477-1040

FAX 312/477-4996

COPPER

1987

1988

POTW

3338

1498

SLUDGE

8818

7908

WASTEWATER

0.80

0.37

MASS BALANCE

12148

9398

MASS BALANCE CHANGE

22.7%



Craftsman Plating & Tinning Corp.

(Check if additional information is provided on Part IV-Supplemental information.)

6. OPTIONAL INFORMATION ON WASTE MINIMIZATION

(Indicate actions taken to reduce the amount of the chemical being released from the facility. See the instructions for coded terms and an explanation of what information to include.)

A. Type of modification (enter code)	B. Quantity of the chemical in the wastestream prior to treatment/disposal		C. Index	D. Reason for action (enter code)
AE	Current reporting year (lb/yr)	Prior year (lb/yr)	Or percent change	



LD10
00024.C

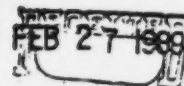
Appendix III.

3155 S. KOLIN AVENUE
CHICAGO, ILL. 60653-4889
(312) 854-2486

Scientific
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TESTING • RESEARCH • CONSULTING

February 22, 1989



National Association
of Metal Finishers
Suite 700
1101 Connecticut Avenue NW
Washington, DC 20036

Attention: Mr. Mark Griffiths

Dear Mark,

The following additional information is provided following our last tele-conference:

1. I have enclosed a sketch of an apparatus that would determine leachable cyanide without any loss due to the acidification step. The determination would be as follows:
 - A) Place sample into flask
 - B) Make all connections
 - C) Add water and turn on vacuum to cause air to enter through thistle tube, flask and scrubber.
 - D) Adjust pH & maintain for 24 hours (can be automated)
 - E) Combine caustic scrubbant with filtrate from extraction and analyze for cyanide by "Standard Methods" colorimetric or titrimetric procedure or equivalent.
2. We have completed our investigation of the question posed by Mr. Berlow:

"Will the leachable cyanide test indicate if a plater is not properly operating his chlorination system?"

As you well know, to investigate the answer to such a question is very difficult, in that it would require an operator to purposely operate his chlorination system in an improper manner. Fortunately, we were able to identify one plater who could do this for a short time, capturing the poorly treated waste for further treatment after we obtained our samples.

The plater was Craftsmen Plating & Tinning Company who originally submitted a filter cake while his system was properly functioning. The test results on this sample were given to EPA at our meeting. A copy of that report (and that of Northwestern Plating) is enclosed. The data showed that when a system is well operated the P006 waste will contain a significant amount of cyanide. That cyanide is very low in leachability both as total cyanide and as amenable to chlorination cyanide.

000059

Craftsman turned off their chlorination system for about a 03 hour period and then re-sampled their filter cake (which consisted of sludge generated while the system operated well plus the sludge generated when the system was not operated well).

The result was an increase in leachable cyanide on this cake to 2.56 mg/Kg and all of this cyanide was amenable to chlorination.

Craftsman then ran an additional experiment to determine if the leachable cyanide would increase if the period of poor operation was longer. After 08 hours of poor chlorination, the leachable cyanide increased to 6.95 mg/Kg. A sample directly from the poorly operated chlorination system generated a filter cake (prepared in our lab) that had 18.1 mg/Kg of leachable cyanide.

The data clearly shows that the leachable cyanide test would yield high results if a waste treatment operator did not properly maintain his chlorination system.

Admittedly, this is only one experiment, but its much more than EPA has so far!

If cyanide must be regulated, it's the leachable cyanide that should be used to verify compliance. We don't have enough data to provide EPA with a suggested regulation, but it seems that 10 mg/L of cyanide (total) would not be out of line considering the above experiment. More work is required.

3. My engineers tell me that there are no Federal regulations for discharge of cyanide from heat treaters to sewers. If this is true, then they only need to meet local regulations which may be much higher than those that platers have to meet! In Chicago it would be 10 mg/L vs. 1.9 mg/L. Therefore, the heat treaters can put more cyanide in the sewers and less into their wastes. This could be added argument on the differences between PQ06 and PQ12 etc. Platers are forced to reduce cyanide to sewers thereby increasing the cyanide in their wastes while heat treaters enjoy an "exemption".

This is all that time permits me to provide you at this time.
Good luck!

Sincerely,

Frank
Frank Altmayer

FA:dkl
enclosures

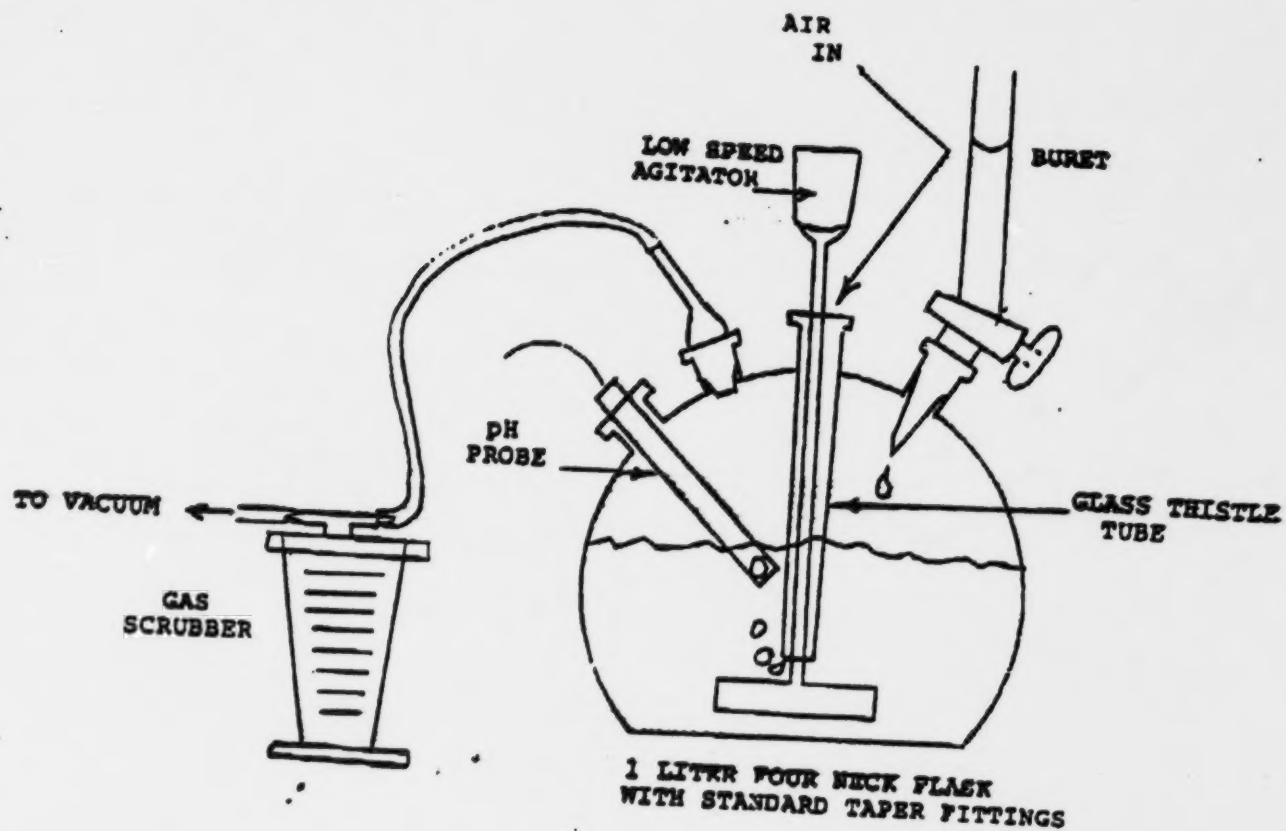
3158 S. MOLIN AVENUE

CHICAGO, ILLINOIS 60623
FAX (312) 254-6661

(312) 254-3406



000060



APPARATUS FOR DETERMINATION OF LEACHABLE
CYANIDE WITHOUT LOSS OF CYANIDE GAS THAT
MIGHT BE GENERATED FROM pH ADJUSTMENT

000061



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CONTROL LABORATORIES, INC.

TESTING • RESEARCH • CONSULTING

3150 S. KOLIN AVENUE
CHICAGO, ILL. 60608-4000
(312) 864-2400
FAX (312) 864-6001

REPORT TO: Craftsman Plating & Tinning Corp.
1250 West Melrose
Chicago, IL 60657

ATTENTION: Mr. James Blacklidge

ORDER NO..

SPECIFICATION NO..

TYPE TEST.

Waste Analysis/Investigation

REPORT NO.: 4-108

RECEIVED: 2-1-89

REPORTED: 2-9-89

IDENTIFICATION OF MATERIAL:

Two (2) samples P006 Filter Cake from the electroplating waste treatment system. The samples were identified as follows:

1. As Generated
2. Stabilized (by Chemical Waste Management)

PURPOSE:

The purpose of this investigation was to determine the amount of total cyanide in these wastes and the leachability of this cyanide.

ANALYTICAL PROCEDURES USED:

The analytical procedures used are found in USEPA SW846 or as noted. TCLP was performed as described by USEPA in the Federal Register.

RESULTS:

1. Analysis of Samples as Received

<u>Sample</u>	<u>Concentrations in mg/Kg (ppm)</u>	
	<u>Total Cyanide</u>	<u>Total Cyanide - dry basis</u>
P006 as Generated	3,260.	10,700.
P006 Stabilized	2,400.	5,980.

2. TCLP Extraction followed by analysis of extraction liquid for cyanide

<u>Sample</u>	<u>Concentrations in mg/L</u>			
	<u>Total Cyanide</u>	<u>Cyanide, Amenable to Chlorination</u>	<u>Cyanide, Reactive</u>	<u>Cyanide,** Weak & Dissociable</u>
P006 as Generated	*0.05	*0.05	*0.05	0.2
P006 Stabilized	0.4	*0.05	*0.05	*0.05

3. The solid residue from the TCLP extraction was analyzed for total cyanide to determine if any cyanide was converted to HCN gas during leaching.

<u>Sample</u>	<u>Concentration in mg/Kg (ppm)</u>	
	<u>Total Cyanide</u>	<u>Total Cyanide - dry basis</u>
P006 as Generated	4,810.	17,950.
P006 Stabilized	1,270.	3,710.

*Denotes "LESS THAN" (Below detectable limit of procedure used).
**Weak and Dissociable Cyanide determined by Standard Methods for the Examination of Water and Wastewater, 16th Edition Method H.

000063



CONCLUSIONS:

- 1) The P006 filter cake from Craftsman Plating & Tinning Company contains a significant amount of total cyanide.
- 2) The cyanide in this filter cake does not leach out to any great extent. That cyanide which does leach (less than 1 mg/L in the TCLP extraction) is not amenable to chlorination and most likely is some filter cake solids not retained by the filter in the TCLP extraction.
- 3) The low cyanide in the TCLP extraction liquid is not because of losses of cyanide due to the formation of gas when the sample is lowered to pH 5.5 for the TCLP extraction. Lower total cyanide was found in the stabilized TCLP residue. However, this may be normal analytical variation caused by the analytical procedure. The high solubility of HCN in water at pH 5.5 would have resulted in high cyanide reading in the extraction liquid if decomposition occurred and this was not the case.
- 4) The cyanide present in this P006 waste appears to be very stable, non-leachable, and not subject to chlorination.

Respectfully submitted,

SCIENTIFIC CONTROL LABORATORIES, INC.

By

Frank Altmayer

FA:dkl
2c 1



RESULTS:

1. Analysis of Samples as Received

<u>Sample</u>	<u>Concentrations in mg/Kg (ppm)</u>	
	<u>Total Cyanide</u>	<u>Total Cyanide - dry basis</u>
P006 as Generated	5,570	30,110
P006 Stabilized	3,880	11,790

2. TCLP Extraction followed by analysis of extraction liquid for cyanide

<u>Sample</u>	<u>Concentrations in mg/L</u>			
	<u>Total Cyanide</u>	<u>Cyanide, Amenable to Chlorination</u>	<u>Cyanide, Reactive</u>	<u>Cyanide,** Weak & Dissociable</u>
P006 as Generated	0.5	*0.05	0.1	0.4
P006 Stabilized	0.7	*0.05	*0.05	0.2

3. The solid residue from the TCLP extraction was analyzed for total cyanide to determine if any cyanide was converted to HCN gas during leaching.

<u>Sample</u>	<u>Concentration in mg/Kg (ppm)</u>	
	<u>Total Cyanide</u>	<u>Total Cyanide - dry basis</u>
P006 as Generated	5,640.	31,510.
P006 Stabilized	2,170.	7,700.

*Denotes "LESS THAN" (Below detectable limit of procedure used).
**Weak and Dissociable Cyanide determined by Standard Methods for the Examination of Water and Wastewater, 16th Edition Method H.





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Scientific
CONTROL LABORATORIES, INC.
TESTING • RESEARCH • CONSULTING

REPORT TO: **Northwestern Plating Works
3114 South Kolin Avenue
Chicago, IL 60623**

ATTENTION: **Mr. Jim Jacobs**

ORDER NO..

REPORT NO.: **4-128**

SPECIFICATION NO..

RECEIVED: **2-1-89**

TYPE TEST.

Waste Analysis/Investigation

REPORTED: **2-9-89**

IDENTIFICATION OF MATERIAL:

Two (2) samples P006 Filter Cake from the electroplating waste treatment system. The samples were identified as follows:

1. As Generated
2. Stabilized (by Chemical Waste Management)

PURPOSE:

The purpose of this investigation was to determine the amount of total cyanide in these wastes and the leachability of this cyanide.

ANALYTICAL PROCEDURES USED:

The analytical procedures used are found in USEPA SW846 or as noted. TCLP was performed as described by USEPA in the Federal Register.

000006

Lab No. 4-128
February 9, 1989

CONCLUSIONS:

- 1) The P006 filter cake from Northwestern Plating Company contains a significant amount of total cyanide.
- 2) The cyanide in this filter cake does not leach out to any great extent. That cyanide which does leach (less than 1 mg/l. in the TCLP extraction) is not amenable to chlorination and most likely is some filter cake solids not retained by the filter in the TCLP extraction.
- 3) The low cyanide in the TCLP extraction liquid is not because of losses of cyanide due to the formation of gas when the sample is lowered to pH 5.5 for the TCLP extraction.
- 4) The cyanide present in this P006 waste appears to be very stable, non-leachable, and not subject to chlorination.

Respectfully submitted,

SCIENTIFIC CONTROL LABORATORIES, INC.

By Frank Altmayer

FA:DKI
2c



Comment Number: II-A

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

For the Second Third proposed rule, the Agency proposed best demonstrated available technology (BDAT) treatment standards for cyanides in F006 nonwastewaters. BDAT treatment standards are developed such that any well-designed and well-operated treatment process should be capable of complying with the standards. When developing treatment standards, the Agency also includes factors that account for performance variability. The proposed cyanide treatment standards were based on performance of wet air oxidation or alkaline chlorination followed by chemical precipitation, settling, and filtration. In the Second Third proposed rule, the Agency also stated the belief that F006 nonwastewaters were being pretreated to below the proposed cyanide treatment standards and therefore would not require commercial cyanide treatment capacity. New performance data on the pretreatment of cyanides by alkaline chlorination also became available to EPA after the proposed rule, and the Agency has evaluated the data. The Agency also received data from several commenters indicating that the proposed cyanide treatment standards for F006 nonwastewaters were not readily achievable. Based on the new performance data on alkaline chlorination, data received from commenters (such as the data supplied by this commenter), and other available information, the Agency reevaluated the proposed cyanide treatment standards for F006. Based on

000068

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

this reevaluation, the Agency has significantly raised the F006 cyanide treatment standards for the Second Third final rule (from 110 mg/kg total cyanides and 0.064 mg/kg amenable cyanides to 590 mg/kg total cyanides and 30 mg/kg amenable cyanides). The cyanide treatment standards being promulgated are based on pretreatment by alkaline chlorination followed by chemical precipitation, settling, and filtration.

Along with the raising of the cyanide treatment standards for the Second Third final rule, EPA performed an analysis to estimate the volume of generated F006 wastes that may exceed the promulgated cyanide standards and therefore require treatment for cyanides. The information sources EPA relied upon for this analysis were: (1) the TSDR Survey capacity data base, (2) Generator Surveys from non-TSDR facilities with exempt hazardous waste treatment capacity, (3) Generator Surveys from TSDR facilities, and (4) F006 data submitted by several commenters. The following is a summary of this analysis.

TSDR Survey

EPA screened the TSDR Survey capacity data base to identify the facilities that generated F006 and those that also had alkaline chlorination or another type of cyanide treatment onsite. It was assumed

000059

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

that these facilities were treating or were able to treat their wastes onsite to meet the cyanide standards and would not need commercial cyanide treatment capacity. The TSDR Surveys for the remaining TSDR facilities identified as generating F006 were evaluated to determine which ones generate noncyanide F006 wastes (e.g., facilities that perform chrome electroplating and therefore do not use cyanides in their process).

As a worst-case scenario, EPA assumed the remaining F006 waste streams (cyanide-bearing F006 wastes generated at facilities that did not have onsite cyanide treatment) have cyanide concentrations above the revised cyanide treatment standards.

The analysis of the TSDR Survey data showed that 104 million gallons of F006 were generated in 1986 at TSDR facilities. (This volume does not include F006 wastes generated at facilities not having a RCRA permit or interim status, i.e., non-TSDR facilities.) Of this 104 million gallons, 72 million gallons (69 percent) are generated at facilities that have onsite cyanide treatment, and 28 million gallons (27 percent) do not contain cyanides. Only 4 million gallons (4 percent) of F006 wastes were generated at these facilities that may, as a worst-case scenario, contain cyanide concentrations above the revised treatment standards. A summary of the F006 analysis conducted from the TSDR Survey capacity data base is presented in Table 1.

000070

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

Generator Survey

Data available for the F006 analysis included about 550 Generator Surveys from facilities not having a RCRA permit or interim status but with exempt hazardous waste treatment capacity onsite (non-TSDRs) and data from about 950 Generator Surveys from TSDR facilities. This limited subset of Generator Surveys was screened to identify facilities that reported generating F006 waste streams. Data were then gathered on the volumes and characteristics of each F006 waste stream, including the reported cyanide concentrations. The reported cyanide concentrations were assumed to be total cyanides.

Review of these Generator Surveys resulted in the identification of 322 facilities generating F006 waste streams. The total volume of F006 waste streams generated at the facilities in 1986 was 96 million gallons. Of this 96 million gallons, 89 million gallons (93 percent) were reported as not containing cyanides or as having cyanide concentrations below the revised total cyanide treatment standard; 7 million gallons (7 percent) were reported either as being of unknown cyanide content, to contain cyanides at unknown concentrations, or to have cyanide concentrations above the revised total cyanide treatment standard. However, generators reported that less than 1.6 percent of the volume of the F006 waste at

000070

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

these facilities had a cyanide concentration above the treatment standard or had cyanides with unknown concentration levels. These data corroborate EPA's conclusions that the total cyanide standard is achievable by application of treatment already existing at generators' facilities. In addition, several of the facilities with unknown cyanide concentrations have onsite cyanide treatment. If it is assumed that these waste streams would meet the BDAT standard, then less than 0.7 percent of the F006 wastes from Generator Survey facilities would require cyanide treatment capacity.

Data from Public Comments

In the public comments for the Second Third proposed rule, the Agency received data from two commenters on cyanide concentrations in F006 waste streams. The data supplied by one commenter, The National Association of Metal Finishers, included data from PDC Laboratories, Inc. (LD10-00024.A) on the total cyanide concentrations in 88 F006 waste stream samples from a variety of generators. Of the reported 88 waste streams, only 8 waste streams (9 percent) had total cyanide concentrations above the revised treatment standard. The commenter did not supply information on waste stream volumes or conditions of treatment.

000072

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

This commenter also supplied information from Craftsman Plating and Tinning Corp. (LD10-00024.B) and Scientific Control Laboratories, Inc. (LD10-00024.C). The information included data on F006 waste streams generated at the Craftsman Plating facility. The data showed that these F006 waste streams contain cyanide levels above the revised treatment standards.

The other commenter, United Technologies, Pratt & Whitney, supplied total and amenable cyanide concentration data on samples from F006 wastes generated at two of its facilities. Upon review of the data, the Agency found that none of the 47 samples for which data were supplied had total cyanide concentrations above the revised treatment standard, and only 2 out of the 47 samples (4 percent) had amenable cyanide concentrations above the revised treatment standard. One sample reported by the commenter was not considered by the Agency. This sample was assumed to have been erroneously reported because the amenable cyanide concentration was greater than the total cyanide concentration. Waste stream volume information was not supplied by the commenter.

Conclusions

A summary of the cyanide concentration data from the Generator Survey and commenter information used to support the F006 analysis is presented

000073

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

in Table 2. Although only data from a subset of F006 generators have been evaluated, it is believed that these data establish that only a small percentage of all F006 wastes will have cyanide concentrations above the revised treatment standards (i.e., only a small percentage of a volume of F006 wastes with cyanides and without cyanides). If EPA considered only the volumes of F006 wastes that had cyanides, the percentage of wastes that would exceed the standard would obviously increase. However, the volume of the land disposed waste includes all F006 wastes land disposed (i.e., volumes with and without cyanides). Thus the appropriate percentage for determination of the volume of land disposed waste that would exceed the standard is the percentage of all F006 wastes that exceed the standards. The data from the TSDR Survey, Generator Survey, and commenters consistently indicate that the percentage of all F006 wastes that may exceed the standard is small, ranging from a low of about 1 percent to a high of about 10 percent. As a worst-case scenario, the Agency estimates that 10 percent of the F006 wastes generated may have cyanide concentrations above the revised treatment standards.

Estimates of required capacity for the land disposal restrictions are based on the volume of waste land disposed, not the volume generated.

000074

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

For the First Third final rule, EPA estimated that 129 million gallons per year of land disposed F006 wastes require alternative treatment. Using the assumption that the percentage of F006 generated that contains cyanide concentrations above the revised treatment standards is representative of the percentage of land disposed F006 waste that contains cyanide concentrations above these standards, the Agency estimates, as a worst-case scenario, that 10 percent of the 129 million gallons of F006 waste land disposed, or about 13 million gallons per year, will require alternative commercial capacity for cyanides. Sufficient alkaline chlorination capacity (46 million gallons per year) exists to treat this volume of waste.

As indicated in the F006 capacity analysis conducted, the Agency acknowledges that some F006 waste streams will require alternative treatment for cyanides. However, based on the revised cyanide treatment standards and the F006 capacity analysis conducted using TSDR and Generator Survey information, the Agency believes that well-designed and well-operated cyanide pretreatment systems will be capable of achieving the cyanide treatment standards for the majority of F006 wastes. The Agency believes that the relatively small volume of F006 that may require

000075

Comment Number: II-A (continued)

Docket Number: LD10-00024

Commenter: National Association of Metal Finishers

Response:

alternative treatment (13 million gallons per year) will be amenable to either pre-generation or post-generation treatment for cyanides. Contrary to the statement made by this commenter, the information available to the Agency shows that effective cyanide treatment capacity is available for the volume of F006 wastes that may require alternative treatment.

000076

Comment Number: II-B

Docket Number: LD10-00006

Commenter: General Dynamics

Comment:

Our final concern centers around both the cost and the time table which would be affected by the new rule. It has been estimated that 130 million gallons of F006 waste are generated every year. Of this, the EPA estimates 52 million gallons are cyanide-bearing and covered by this rule. The treatment proposed by the EPA includes electrolytic oxidation, alkaline chlorination, precipitation, filtration, and stabilization of metals. To implement this kind of treatment would require complete process changes, huge holding tanks, and extra equipment, all of which are extremely costly and would be impossible to have in operation by the effective date of June 1989.

000077

Comment Number: II-B

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

For the Second Third proposed rule, the Agency proposed best demonstrated available technology (BDAT) treatment standards for cyanides in F006 nonwastewaters. BDAT treatment standards are developed such that any well-designed and well-operated treatment process should be capable of complying with the standards. When developing treatment standards, the Agency also includes factors that account for performance variability. The proposed cyanide treatment standards were based on performance of wet air oxidation or alkaline chlorination followed by chemical precipitation, settling, and filtration. In the Second Third proposed rule, the Agency also stated the belief that F006 nonwastewaters were being pretreated to below the proposed cyanide treatment standards and therefore would not require commercial cyanide treatment capacity. New performance data on the pretreatment of cyanides by alkaline chlorination also became available to EPA after the proposed rule, and the Agency has evaluated the data. The Agency also received data from several commenters indicating that the proposed cyanide treatment standards for F006 nonwastewaters were not readily achievable. Based on the new performance data on alkaline chlorination, data received from commenters (such as the data supplied by this commenter), and other available information, the Agency reevaluated the proposed cyanide treatment standards for F006. Based on

000078

Comment Number: II-B (continued)

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

this reevaluation, the Agency has significantly raised the F006 cyanide treatment standards for the Second Third final rule (from 110 mg/kg total cyanides and 0.064 mg/kg amenable cyanides to 590 mg/kg total cyanides and 30 mg/kg amenable cyanides). The cyanide treatment standards being promulgated are based on pretreatment by alkaline chlorination followed by chemical precipitation, settling, and filtration.

Along with raising of the cyanide treatment standards for the Second Third final rule, EPA performed an analysis to estimate the volume of generated F006 wastes that may exceed the promulgated cyanide standards and therefore require treatment for cyanides. The information sources EPA relied upon for this analysis were: (1) the TSDR Survey capacity data base, (2) Generator Surveys from non-TSDR facilities with exempt hazardous waste treatment capacity, (3) Generator Surveys from TSDR facilities, and (4) F006 data submitted by several commenters. The following is a summary of this analysis.

TSDR Survey

EPA screened the TSDR Survey capacity data base to identify the facilities that generated F006 and those that also had alkaline chlorination or another type of cyanide treatment onsite. It was assumed

000079

Comment Number: II-B (continued)

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

that these facilities were treating or were able to treat their wastes onsite to meet the cyanide standards and would not need commercial cyanide treatment capacity. The TSDR Surveys for the remaining TSDR facilities identified as generating F006 were evaluated to determine which ones generate noncyanide F006 wastes (e.g., facilities that perform chrome electroplating and therefore do not use cyanides in their process).

As a worst-case scenario, EPA assumed the remaining F006 waste streams (cyanide-bearing F006 wastes generated at facilities that did not have onsite cyanide treatment) have cyanide concentrations above the revised cyanide treatment standards.

The analysis of the TSDR Survey data showed that 104 million gallons of F006 were generated in 1986 at TSDR facilities. (This volume does not include F006 wastes generated at facilities not having a RCRA permit or interim status, i.e., non-TSDR facilities.) Of this 104 million gallons, 72 million gallons (69 percent) are generated at facilities that have onsite cyanide treatment, and 28 million gallons (27 percent) do not contain cyanides. Only 4 million gallons (4 percent) of F006 wastes were generated at these facilities that may, as a worst-case scenario, contain cyanide concentrations above the revised treatment standards. A summary of the F006 analysis conducted from the TSDR Survey capacity data base is presented in Table 1.

000080

Comment Number: II-B (continued)

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

Generator Survey

Data available for the F006 analysis included about 550 Generator Surveys from facilities not having a RCRA permit or interim status but with exempt hazardous waste treatment capacity onsite (non-TSDRs) and data from about 950 Generator Surveys from TSDR facilities. This limited subset of Generator Surveys was screened to identify facilities that reported generating F006 waste streams. Data were then gathered on the volumes and characteristics of each F006 waste stream, including the reported cyanide concentrations. The reported cyanide concentrations were assumed to be total cyanides.

Review of these Generator Surveys resulted in the identification of 322 facilities generating F006 waste streams. The total volume of F006 waste streams generated at the facilities in 1986 was 96 million gallons. Of this 96 million gallons, 89 million gallons (93 percent) were reported as not containing cyanides or as having cyanide concentrations below the revised total cyanide treatment standard; 7 million gallons (7 percent) were reported as either being of unknown cyanide content, to contain cyanides at unknown concentrations, or to have cyanide concentrations above the revised total cyanide treatment standard. However, generators reported that less than 1.6 percent of the volume of the F006 waste at

000081

Comment Number: II-B (continued)

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

these facilities had a cyanide concentration above the treatment standard or had cyanides with unknown concentration levels. These data corroborate EPA's conclusions that the total cyanide standard is achievable by application of treatment already existing at generators' facilities. In addition, several of the facilities with unknown cyanide concentrations have onsite cyanide treatment. If it is assumed that these waste streams would meet the BDAT standard, then less than 0.7 percent of the F006 wastes from Generator Survey facilities would require cyanide treatment capacity.

Data from Public Comments •

In the public comments for the Second Third proposed rule, the Agency received data from two commenters on cyanide concentrations in F006 waste streams. The data supplied by one commenter, The National Association of Metal Finishers, included data from PDC Laboratories, Inc. (LD10-00024.A) on the total cyanide concentrations in 88 F006 waste stream samples from a variety of generators. Of the 88 waste streams reported, only 8 waste streams (9 percent) had total cyanide concentrations above the revised treatment standard. The commenter did not supply information on waste stream volumes or conditions of treatment.

000082

Comment Number: II-B (continued)

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

The other commenter, United Technologies, Pratt & Whitney, supplied total and amenable cyanide concentration data on samples from F006 wastes generated at two of its facilities. Upon review of the data, the Agency found that none of the 47 samples for which data were supplied had total cyanide concentrations above the revised treatment standard, and only 2 out of the 47 samples (4 percent) had amenable cyanide concentrations above the revised treatment standard. One sample reported by the commenter was not considered by the Agency. This sample was assumed to have been erroneously reported because the amenable cyanide concentration was greater than the total cyanide concentration. Waste stream volume information was not supplied by the commenter.

Conclusions

A summary of the cyanide concentration data from the Generator Survey and commenter information used to support the F006 analysis is presented in Table 2. Although only data from a subset of F006 generators have been evaluated, it is believed that these data establish that only a small percentage of all F006 wastes will have cyanide concentrations above the revised treatment standards (i.e., only a small percentage of a volume of F006 wastes with cyanides and without cyanides). If EPA considered only

000083

Comment Number: II-B (continued)

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

the volumes of F006 wastes that had cyanides, the percentage of wastes that would exceed the standard would obviously increase. However, the volume of the land disposed waste includes all F006 wastes land disposed (i.e., volumes with and without cyanides). Thus the appropriate percentage for determination of the volume of land disposed waste that would exceed the standard is the percentage of all F006 wastes that exceed the standards. The data from the TSDR Survey, Generator Survey, and commenters consistently indicate that the percentage of all F006 wastes that may exceed the standard is small, ranging from a low of about 1 percent to a high of about 10 percent. As a worst-case scenario, the Agency estimates that 10 percent of the F006 wastes generated may have cyanide concentrations above the revised treatment standards.

Estimates of required capacity for the land disposal restrictions are based on the volume of waste land disposed, not the volume generated. For the First Third final rule, EPA estimated that 129 million gallons per year of land disposed F006 wastes require alternative treatment. Using the assumption that the percentage of F006 generated that contains cyanide concentrations above the revised treatment standards is representative of the percentage of land disposed F006 wastes that

000084

Comment Number: II-B (continued)

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

contains cyanide concentrations above these standards, the Agency estimates, as a worst-case scenario, that 10 percent of the 129 million gallons of F006 waste land disposed, or about 13 million gallons per year, will require alternative commercial capacity for cyanides. Sufficient alkaline chlorination capacity (46 million gallons per year) exists to treat this volume of waste.

This commenter reported that 130 million gallons of F006 wastes are generated annually. The Agency believes that this number is actually the volume of F006 wastes that is land disposed annually and therefore requires alternative treatment because of the land disposal restrictions. (The volume of F006 wastes land disposed is estimated by the Agency to be 129 million gallons per year.) The Agency believes that the volume of F006 generated annually is actually higher. The commenter also reported an EPA estimate of 52 million gallons of cyanide-bearing F006 wastes. The commenter does not give the source of this estimate, and it is not known how much of the 52 million gallon amount has cyanide concentrations above the revised treatment standards.

This commenter indicated that alternative treatment of F006 waste would require complete process changes, huge holding tanks, and extra equipment. The Agency believes that this is not true. Based on the

000085

Comment Number: II-B (continued)

Docket Number: LD10-00006

Commenter: General Dynamics

Response:

revised cyanide treatment standards and the F006 capacity analysis conducted, the Agency estimates, as a worst-case scenario, that 13 million gallons per year of F006 wastes may require commercial treatment capacity and that adequate treatment capacity currently exists for this volume of F006 wastes. Also, the Agency does not consider cost when making capacity determinations. Based on the factors described above, a capacity variance is not considered to be necessary for F006 wastes.

000086

Document Number: II-C

Socket Number: LDIC-L0004

Commenter: *United Technologies, Pratt & Whitney*

Comment:

Pratt & Whitney (P&W) is the major group in the Power Sector of United Technologies Corporation. P&W operates six major industrial facilities in Connecticut and one in Maine. These facilities manufacture, assemble and test aircraft jet engines and engine components. The developing and manufacturing of jet engines is a high technology industry often using "state of the art" materials and processes. Hazardous waste are generated by fabricating, cleaning, finishing, coating, testing and research operations. Included would be F006 wastes, which are wastewater treatment sludges from electroplating operations. All seven facilities mentioned above generate some form of F006 wastes. Together they produce approximately 3,000 cubic yards of F006 wastes annually.

In order to properly dispose of this F006 waste, P&W is currently operating a landfill, at its Middletown, Connecticut Facility. This landfill has been issued a RCRA Permit by EPA Region I. P&W actively pursued the Part B Application process for over four years. During this time P&W had to revise its Part B application eight times in response to changing laws, regulations, and EPA guidance. P&W has spent in excess of \$1,000,000 in construction of the site, groundwater monitoring, and preparing the Part B application, since 1980. This landfill also has a State of Connecticut Solid Waste Permit and Groundwater Discharge Permit. The Solid Waste Permit was issued for the life of the landfill and Groundwater Discharge Permit was recently renewed. The landfill itself is a monofill, containing only F006 wastes generated at P&W facilities. It is the only disposal option within 300 miles of P&W's main facility in East Hartford, Connecticut and represents significant cost savings over using a commercial disposal facility. If the P&W F006 landfill ceases to operate, it will jeopardize P&W's ability to effectively compete in the market place.

The Land Disposal Restrictions for First Third Wastes, which were effective on August 8, 1988, has had a significant impact on P&W Operations. Essentially, the land disposal of F006 wastes by P&W was prohibited, on August 8, 1988 since the waste, as generated, fails to meet the published treatment standards. EPA's delay in identifying Best Demonstrated Available Technology (BDAT), for F006 Wastes, has created the situation that makes P&W unable to comply with

000087

Comment Number: II-C (Continued)

Docket Number: LDIC-L0004

Commenter: *United Technologies, Pratt & Whitney*

Comment:

the regulations while continuing to dispose of waste in its landfill, until such time that stabilization technology is installed. We recognize that identifying BDAT is a time consuming process which has been put on a constricted timetable, by the Congressional mandate in the Hazardous and Solid Waste Amendments, enacted on November 8, 1984. It is possible, that EPA, in their haste, has published F006 treatment standards which may be difficult to achieve.

EPA also did not grant a variance on the restrictions for F006 wastes, RCRA Section 3004(h), stating that there was more than enough capacity nationwide to treat all the F006 wastes produced. This also effectively eliminated the possibility of P&W receiving a variance, under RCRA Section 3004(h) and 40 CFR 268.5, on a case by case basis, since even if P&W has a contractual commitment or plan to construct or provide alternate treatment capacity, EPA has stated that there is adequate treatment capacity available nationwide.

Based on the promulgated treatment standards, P&W's F006 wastes must undergo treatment prior to landfill. Therefore, we are pursuing options which we hope will enable us to comply with the regulations. The options include developing and installing stabilization technology for our F006 wastes at the Middletown landfill facility and investigating the use of commercial disposal facilities.

In fact, P&W has been forced to export its F006 wastes to Canada in order to secure adequate treatment. The cost of this vendor disposal is expected to be about \$1,000,000 annually. In August 1988, there were no United States RCRA commercial treatment facilities willing to sign a contract for the disposal of P&W's F006 wastes. In fact P&W has still not been able to contract with a second facility for F006 disposal.

The development and installation of a stabilization facility will take a minimum of one year to complete and possibly longer to obtain a permit under RCRA. P&W has performed bench scale tests on several stabilization processes and prepared a conceptual design with cost estimates for the installation of a stabilization facility. The construction cost was estimated at approximately \$1,500,000. Annual operating expenses for the stabilization facility were projected at \$250,000.

Furthermore, since EPA prohibited the land disposal of F006 wastes, the storage of F006 wastes is also prohibited, unless such storage is solely for the purpose of the accumulation of such quantities of waste as are necessary to facilitate proper treatment and disposal (RCRA Section 3004(j) and 40 CFR 268.50). This means that P&W will not be able to store its F006 wastes until such time that a stabilization facility can be built.

While P&W was preparing to go ahead with the stabilization project, EPA, on January 11, 1989, proposed Land Disposal Restrictions for Second Third Wastes. Included with the second third wastes, were treatment standards for several First Third Wastes, namely F007, F008, and F009 cyanide wastes. Also included were additional land disposal restrictions for Wastewater Treatment Plant

000088

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter:

Comment: United Technologies, Pratt & Whitney

Sludges from Electroplating Operations (F006), specifically for total and amenable cyanide. The EPA stated that they do not believe that stabilization is an applicable technology for the treatment of amenable or complex cyanide constituents in wastes and they believe that Congress intended that the destruction of total cyanides would be required as a precondition to land disposal.

The EPA identified the following destruction technologies as applicable and demonstrated for the cyanide constituents in F006 wastes: electrolytic oxidation; alkaline chlorination; high temperature hydrolysis; and oxidation with sulfur dioxide and air or potassium permanganate. The proposed F006 wastes cyanide treatment standards are based on the BDAT being electrolytic oxidation followed by alkaline chlorination. The existing F006 wastes metal treatment standards are based on BDAT being chemical precipitation followed by filtration and stabilization. The treatment standard established for the cyanide is based on a total waste analysis for amenable and total cyanide concentration in F006 waste. The standards were set at 110 mg/kg total cyanide and 0.064 mg/kg amenable cyanide.

EPA's haste in setting the proposed standards, has led to several errors in judgement with regards to existing technology and current practices in treating cyanide bearing waste streams. The proposed treatment standards are based on a limited analysis of batch treated concentrated liquid cyanide wastes. EPA then transferred these standards to non wastewaters. EPA has stated they believe "that transferring treatment performance data to establish treatment standards for untested wastes or constituents is technically valid when the untested wastes are generated from similar industries and/or similar processing steps or when the constituents have similar chemical and physical properties". EPA further stated that "these wastes are not expected to contain treatable concentrations of cyanide if generated following treatment by a well-designed and well-operated cyanide treatment step. With this in mind EPA "believes that the cyanide treatment standards for the metal finishing sludges "subcategory can be met by well-designed and well-operated alkaline chlorination alone". In making these assumptions EPA has failed to adequately account for the inherent physical differences in solid and liquid waste streams as well as the differences between dilute and concentrated cyanide waste streams.

The first oversight has to do with analyzing wastes for cyanide. EPA in their BDAT document only references Methods 9010 and 9012 from SW-846. Both these methods state their application is "to determine the concentration of inorganic cyanide in aqueous waste or leachate" and there are no approved procedures for determining the total and amenable cyanide concentration in sludges. Included with this is the inherent accuracy and relationship when determining the total and amenable concentration of cyanide. Included as Attachment A is a letter from Mr. L. S. Averill, Co-Director of Averill Environmental Laboratory Inc., discussing these problems. Basically Mr. Averill concludes that to "indicate there can be an analytical relationship between Total Cyanide of 110 mg/kg and Amenable Cyanide of 0.064 mg/kg through six significant figures is absurd". Mr. Averill also describes other problems associated with the analysis of sludge samples for total and amenable cyanide.

000089

Comment Number: II-C (continued)

Socket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Comment:

The EPA treatment standards are expressed in terms of mg/kg of waste. The repeatability of laboratory results for such wastes is doubtful. A waste F006 sludge sample may contain from 30% to 80% water. The dryness of the sludge may change during normal operation of a waste treatment system or during laboratory handling. For this reason we believe that any treatment standard be expressed as a percent of dry weight to ensure consistency.

The next problem deals with the differences between dilute and concentrated cyanide waste streams. The initial concentration of cyanide will often determine the time necessary for a complete reaction. EPA has stated that their chosen BDAT of electrolytic oxidation is usually a batch process with an "excessive reaction time", that may take "days or weeks" to complete. Normally concentrated solutions are treated by batches while dilute wastes are treated continuously. Continuous dilute cyanide wastewater treatment systems do not achieve complete cyanide destruction. This fact is recognized by EPA in setting NPDES Effluent Guidelines. Often cyanide constituents will settle in the sludge (F006). These cyanide constituents in the sludge may not be amenable when they first settle, but chemical reactions in the sludge may take place.

To illustrate these matters P&W is submitting data from two of its facilities. Both facilities are located in Connecticut, one in East Hartford and one in North Haven. Each facility has a NPDES Permit for an industrial wastewater treatment system. Neither facility treats concentrated waste cyanide solutions, although the East Hartford Facility treats concentrated aqueous waste plating solutions other than those containing cyanide. Both plants use cyanides in electroplating operations and the dilute rinse waters from those operations are directed to a continuous two stage alkaline chlorination cyanide pretreatment system. The permit limitation for amenable cyanide is a daily average concentration of 0.32 mg/l measured at the discharge of the cyanide pretreatment system. Compliance is determined by analyzing four composite samples per month. Data is presented starting from October 1984 when the current permit monitoring requirements became effective. Also included are the results from quarterly monitoring for cyanide on the F006 wastes produced from the operation of the two waste treatment systems, from September 1982 to June 1988. This data was obtained pursuant to P&W's Connecticut Solid Waste Permit to operate the Middletown Connecticut F006 Landfill. The cyanide mass analyses are expressed in terms of percent of dry weight. Mass analyses are also calculated as mg/kg, for comparison purposes. The leachate analyses were performed using the EP Toxicity Test Procedures in 40 CFR 261 Appendix II, except that distilled water was used to leach the sludge in place of acetic acid.

The data for the East Hartford facility, which has a permitted flow of 4.032 million gallons per day, is included in Attachment B. NPDES results are given for discharge no. 001, discharge no. 001A, the cyanide pretreatment outfall and the pretreatment wet well; discharge no. 001 is the final facility discharge; discharge no. 001A is a composite of the batch treated concentrated wastes each month; the cyanide pretreatment outfall immediately follows the second stage cyanide pretreatment tank; and the pretreatment wet well includes all dilute wastewater streams and the batch concentrated wastes being transferred to the main waste treatment system. The main waste treatment

000090

Comment Number: II-C (Continued)

Docket Number: LDIC - L0004

Commenter: United Technologies, Pratt & Whitney

Comment: system consists of pH adjustment with lime, followed by flocculation, precipitation. The treated wastewater is discharged and the precipitated solids are filtered to produce F006 waste. The data shows that the P&W treatment facility is well-designed and well-operated in that it is consistently in compliance with its NPDES Permit. However the sludge analysis data for the same time period indicates that ten out of fifteen samples could not pass the proposed treatment standard for amenable cyanide.

The data for the North Haven facility, which has a permitted flow of 1.512 million gallons per day, is included in Attachment C. NPDES results are given for the cyanide pretreatment outfall which immediately follows the second stage cyanide pretreatment tank. The main waste treatment system consists of pH adjustment with lime, followed by flocculation, precipitation. The treated wastewater is discharged and the precipitated solids are filtered to produce F006 waste. The data shows that the P&W treatment facility is well-designed and well-operated in that it is consistently in compliance with its NPDES Permit. However the sludge analysis data for the same time period indicates that ten out of fifteen samples could not pass the proposed treatment standard for amenable cyanide.

Based on a review of this data EPA's conclusions that F006 wastes are not expected to contain treatable concentrations of cyanide, if generated following treatment by a well-designed and well-operated cyanide treatment step, and that the cyanide treatment standards can be met by well-designed and well-operated alkaline chlorination alone, are in error.

EPA has set BOAT treatment for cyanide in a manner that requires all cyanide wastes to be treated before a sludge is generated. While this may be appropriate for concentrated wastes which lend themselves to batch treatment it does not address dilute waste streams which are usually treated in flow through systems. The cyanide pretreatment system at the East Hartford Facility has a design flow rate of approximately 400 gallons per minute. To convert this process to a batch treatment mode is not practical, due to the reaction time and flow rates. This means that to meet the proposed cyanide treatment standards cyanide, a F006 waste stabilization facility will need provisions for the treatment of cyanide. There is currently no available demonstrated technology for cyanide treatment in metal finishing sludges.

We are therefore making the following recommendations for EPA action in this matter:

1. We recommend that EPA not finalize the cyanide treatment standards for metal finishing sludges until such time that they have adequate data to demonstrate their conclusions. This action is essential since, the methods described in the Best Demonstrated Available Technology (BOAT) Background Document are insufficient, to firmly establish the treatment standards.
2. We recommend that EPA revise 40 CFR 270.10(e), General application requirements - Existing MWM facilities and interim status qualifications.

000091

Comment Number: II-C (continued)

Docket Number: LDIC - L0004

Commenter: United Technologies, Pratt & Whitney

Comment:

interim status for treatment by stabilization. This would be conditional upon the facility making a binding contractual commitment to install stabilization technology. It should also include the potential use of temporary mobile on site treatment at the place of disposal, until such time that permanent EPA approved stabilization facilities can be designed and constructed. Consideration should also be given to allowing interim status for storage of F006 wastes, while a stabilization facility is being built.

We recommend that EPA revise 40 CFR 268.5, to permit a variance, for an existing F006 landfill facility to keep operating while it is constructing the required stabilization technology, if it has made a binding contractual commitment to install stabilization technology and EPA has approved a timely construction schedule. Such a revision should mandate EPA to make a decision on the variance in a timely manner, thirty (30) to sixty (60) days. This change is necessary since EPA's initial conclusion that there is adequate treatment capacity available for stabilizing F006 wastes has been proven in error.

If EPA fails to take any action regarding these first third cyanide containing wastes, by June 8, 1989 there will be no change in the current status. In effect these wastes are covered by the soft hammer provisions. We feel that the above recommendations, are consistent with the Congressional mandate in the Hazardous and Solid Waste Amendments, will not cause any adverse effects on the environment, will allow EPA adequate time to develop meaningful F006 treatment standards, and will allow many facilities to come into compliance with the F006 land ban regulations in a timely cost effective manner.

Cyanokem gives the reaction time necessary for their treatment process as a four day residence time. This will require P&W and other firms to substantially increase their treatment and storage capacity for compliance. There are no data presented to document that there is available nationwide capacity for cyanide storage and treatment, and no data are presented concerning the time and capital dollars required for compliance.

000092

ATTACHMENT A

000093

AVERRILL ENVIRONMENTAL LABORATORY, INC.

James S. Averill, Jr. Director

Paul C. Clark Organic Supervisor

Calvin M. Anderson Jr. Director

February 23, 1989

United Technologies Corporation
Pratt & Whitney Div.
Plant Engineering, 8-Mezzanine
Mail Stop 102-15
East Hartford, CT 06108

Attn: Merwin Andrew

Re: Land Disposal Restrictions Proposed
for "Second-Third Hazardous Waste:
F006 Sludge Cyanide Total and Amenable
Federal Register, January 11, 1989
Page 14, 15 and Appendix A

Dear Mr. Andrew:

In review of the referenced material, the following comments and questions are forwarded for information purposes.

First, it is necessary to understand the terms Total Cyanide and Amenable Cyanide are related analytically and mathematically. To indicate there can be a analytical relationship between Total Cyanide of 110 mg/kg and Amenable Cyanide of 0.064 mg/kg through six significant figures is absurd. There isn't any analysis in Appendix A, waste composition where more than three significant figures are used and in most cases only two significant figures were reported in the analysis.

Based on this scenario of significant figures:

- a. For a total cyanide of 100 mg/kg, the cyanide amenable limit 1.0 mg/kg
- b. For a total cyanide of 10 mg/kg, the cyanide amenable limit 0.1 mg/kg
- c. For a total cyanide of 1.0 mg/kg, the cyanide amenable limit 0.01 mg/kg

Second, based on aqueous analytical procedures for cyanide, there is no specific sludge method, the optimistic detection limit for cyanide based on a 100 gram sample would be 0.025 mg/kg. Any analyst who has tried to boil and reflux 100 grams of sludge, solids greater than 20 percent, or soils, understands the problems associated with it, and prefers to use 10 gram samples with a detection limit of 0.25 mg/kg. It is questionable how a detection limit less than 0.10, initial sample of 25 grams can be obtained without the test actually being a major research project to develop and interpret any reasonable data.



United Technologies Corporation
Pratt & Whitney Div.
Att: Merwin Andrew
February 23, 1989
Page Two

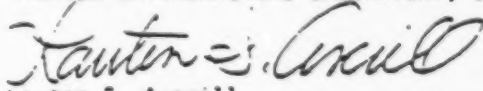
Third, the relationship between Total and Amenable Cyanides are well established with minor analytical problems in homogeneous water and wastewater systems while there are major problems in aqueous sludges, greater than 2 percent solids, heterogeneous mixtures. For instance, there are instances where after chlorination the Total Cyanide concentration is greater than the initial Total Cyanide concentration indicating a chemical reaction between the alkaline chlorine and other forms of cyanide converting that form to a measureable form of cyanide.

I believe the best accurate analytical procedure to measure the impact of the F006 sludges, which were not addressed in Appendix A, for cyanide total and amenable is either a distilled water or alkaline water elutriation procedure testing the extract for total and amenable cyanide.

If there are any questions or comments, please call.

Very truly yours,

AVERILL ENVIRONMENTAL LABORATORY, INC.


Lawton S. Averill

LSA:lj

000095

ATTACHMENT B

000070

USE PHASE 1 UNITARY EAST HARTFORD, CONNECTICUT FACILITY

WEIGHT MONITORING RESULTS

FORM WASTE

DATE	DISCHARGE No. 001		DISCHARGE No. 002A		CYANIDE PRETREATMENT		PRETREATMENT USE		FORM WASTE MASS ANALYSIS				LEACHATE ANALYSIS			
	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	TOTAL PERCENT SOLIDS	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL
09/09/82	< 0.002								38.4%	0.00780	0.00010	30.100	0.386	0.110		
12/01/82	< 0.002								65.3%	0.01010	0.00380	65.753	17.216	0.190		
03/08/83	0.015	0.020							39.2%	0.00460	0.00460	18.032	18.032	0.009	0.007	
06/07/83	0.015								65.3%	0.00070	0.00006	3.171	0.272	< 0.002	< 0.002	
09/13/83	0.021								62.9%	0.00033	< 0.00001	1.616	< 0.002	< 0.002	< 0.002	
12/19/83	< 0.002								40.5%	0.00370	0.00060	16.985	2.630	< 0.002	< 0.002	
03/22/84	0.050								36.1%	0.00290	0.00270	18.669	9.767	< 0.002	< 0.002	
06/26/84	< 0.002								39.6%	0.00006	< 0.00001	0.269	< 0.002	< 0.002	< 0.002	
09/06/84	< 0.002		18.0						61.4%	0.00360	0.00360	16.906	16.906	0.030		
10/02/84																
10/09/84																
10/16/84																
10/23/84																
11/06/84																
11/13/84																
11/20/84																
11/27/84																
12/04/84			18.0													
12/10/84																
12/11/84	< 0.002		30.0													
12/18/84	0.063		1.90													
12/25/84	< 0.002		5.80													
1/03/85	< 0.002		< 0.010													
1/08/85	0.056	< 0.002	0.56													
1/15/85	< 0.002		0.01													
1/22/85	< 0.002		0.51													
2/05/85	< 0.002															
2/12/85	< 0.002		6.00		< 0.002		0.051	0.051								
2/19/85	0.016	< 0.002	< 0.010		0.008	0.008	0.018	0.018								
					0.210	0.040	0.005									

000097

FORM UASIE

WEEKLY WPT'S MONITORING RESULTS

DATE	DISCHARGE NO. 001		DISCHARGE NO. 002A		CYANIDE PRETREATMENT		PRETREATMENT LET WELL		FORM UASIE MASS ANALYSIS			LEACHATE ANALYSIS		
	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL	PERCENT SOLIDS	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL AMENABLE
02/26/85	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028	90.0%	0.00560	0.00380	44.800	30.400	0.002
03/05/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
03/12/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
03/12/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
03/19/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
03/26/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
04/02/85	0.013	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
04/09/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
04/16/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
04/23/85	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	90.0%	0.00560	0.00380	44.800	30.400	0.002
05/07/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
05/14/85	0.170	0.170	0.170	0.170	0.170	0.170	0.170	0.170	90.0%	0.00560	0.00380	44.800	30.400	0.002
05/21/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
05/28/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
06/04/85	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	90.0%	0.00560	0.00380	44.800	30.400	0.002
06/11/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
06/18/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
06/24/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
06/25/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
07/02/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
07/09/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
07/16/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
07/23/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
08/06/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
08/13/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
08/20/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
08/27/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
09/03/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002
09/04/85	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	90.0%	0.00560	0.00380	44.800	30.400	0.002

UIC PRATE & UNITARY - EAST HARTFORD, CONNECTICUT FACILITY

FOOD WASTE

WEEKLY WPO'S MONITORING RESULTS

DATE	DISCHARGE NO. 001		DISCHARGE NO. 001A		CYANIDE TREATMENT		PRETREATMENT WEL WELL		FOOD WASTE MASS ANALYSIS				LEACHATE ANALYSIS			
	CYANIDE		CYANIDE		CYANIDE		CYANIDE		TOTAL		CYANIDE		CYANIDE		CYANIDE	
	TOTAL	AMENABLE	TOTAL	AMENABLE	TOTAL	AMENABLE	TOTAL	AMENABLE	PERCENT	SO L106	% DRY WT	AMENABLE	TOTAL	AMENABLE	TOTAL	AMENABLE
09/10/85	< 0.002	•	< 0.010	•	< 0.002	•	< 0.002	•	•	•	•	•	•	•	•	•
09/17/85	< 0.002	•	18.2	•	< 0.002	•	< 0.002	•	•	•	•	•	•	•	•	•
09/24/85	< 0.002	•	< 0.010	•	0.022	< 0.002	< 0.002	< 0.002	•	•	•	•	•	•	•	•
10/01/85	0.011	0.011	< 0.010	•	< 0.002	•	< 0.002	•	•	•	•	•	•	•	•	•
10/08/85	< 0.002	•	< 0.010	•	0.015	0.015	< 0.002	•	•	•	•	•	•	•	•	•
10/15/85	< 0.002	•	< 0.010	•	< 0.002	•	< 0.002	•	•	•	•	•	•	•	•	•
10/22/85	0.076	< 0.002	•	•	0.150	< 0.002	< 0.002	•	•	•	•	•	•	•	•	•
11/05/85	0.029	0.029	0.515	•	0.390	0.070	0.068	0.068	•	•	•	•	•	•	•	•
11/12/85	< 0.002	•	5.23	•	0.061	0.061	< 0.002	•	•	•	•	•	•	•	•	•
11/19/85	< 0.002	•	< 0.010	•	0.130	0.119	0.019	0.019	•	•	•	•	•	•	•	•
11/26/85	< 0.002	•	0.760	•	0.210	< 0.002	0.013	< 0.002	•	•	•	•	•	•	•	•
12/03/85	< 0.002	•	•	•	0.215	0.215	0.150	0.004	•	•	•	•	•	•	•	•
12/10/85	0.055	< 0.002	6.10	•	0.235	0.091	0.060	0.005	•	•	•	•	•	•	•	•
12/17/85	0.008	< 0.002	< 0.010	•	0.190	0.070	0.029	0.004	•	•	•	•	•	•	•	•
12/23/85	< 0.002	•	7.20	•	0.164	0.076	< 0.002	•	•	•	•	•	•	•	•	•
01/07/86	< 0.002	•	0.510	•	0.065	0.045	< 0.002	•	•	•	•	•	•	•	•	•
01/14/86	0.022	0.021	< 0.010	•	0.040	< 0.002	< 0.002	•	•	•	•	•	•	•	•	•
01/21/86	< 0.002	•	< 0.010	•	0.058	< 0.002	< 0.002	•	•	•	•	•	•	•	•	•
01/28/86	0.022	< 0.002	33.0	•	0.058	0.048	< 0.002	•	•	•	•	•	•	•	•	•
02/04/86	< 0.002	•	0.075	•	0.105	0.105	< 0.002	•	•	•	•	•	•	•	•	•
02/11/86	< 0.002	•	< 0.010	•	0.029	0.029	< 0.002	•	•	•	•	•	•	•	•	•
02/18/86	< 0.002	•	6.05	•	0.115	0.047	< 0.002	•	•	•	•	•	•	•	•	•
02/25/86	0.027	0.027	5.04	•	0.018	0.005	0.012	< 0.002	•	•	•	•	•	•	•	•
03/04/86	< 0.002	•	11.6	•	0.200	0.022	< 0.002	•	•	•	•	•	•	•	•	•
03/05/86	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
03/11/86	< 0.002	•	< 0.010	•	0.150	0.012	< 0.002	•	•	•	•	•	•	•	•	•
03/18/86	< 0.002	•	< 0.010	•	0.100	0.075	< 0.002	•	•	•	•	•	•	•	•	•
03/25/86	0.012	0.010	43	•	0.210	0.010	0.022	< 0.002	•	•	•	•	•	•	•	•
35.38	0.00078	0.00021	2.753	0.761	< 0.002	< 0.002	< 0.002	< 0.002	•	•	•	•	•	•	•	•
37.88	0.00100	0.00006	7.486	0.151	0.080	< 0.002	< 0.002	< 0.002	•	•	•	•	•	•	•	•

WEEKLY WEIGHT MONITORING RESULTS

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000100

WEEKLY WPPES MONITORING RESULTS

DATE	DISCHARGE No. 001			DISCHARGE No. 002A			CYANIDE PRETREATMENT			PRETREATMENT UNIT			TOTAL PERCENT SOLIDS X DRY WT			FOMAS UNSTE MASS ANALYSIS			LEACHATE ANALYSIS		
	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL
10/28/86	< 0.002				0.490		0.138	0.064		< 0.002											
11/04/86	< 0.002		< 0.010		< 0.010		0.061	< 0.002		< 0.002											
11/11/86	< 0.002		< 0.010		< 0.010		0.008	< 0.002		< 0.002											
11/18/86	0.075	0.003			0.090		0.064	0.046		< 0.002											
11/25/86	0.225	0.170	< 0.010		< 0.010		0.14	0.07	0.025	0.025											
12/02/86	< 0.002		< 0.010		< 0.010		0.077	0.077	< 0.002												
12/08/86																					
12/09/86	< 0.002		< 0.010		< 0.010		0.300	< 0.002		< 0.002											
12/16/86	< 0.002		< 0.010		< 0.010		0.132	< 0.002		< 0.002											
12/23/86	< 0.002				7.4		0.155	< 0.002		< 0.002											
01/06/87	0.018	< 0.002	< 0.010		< 0.010		0.118	0.014	0.011	0.011											
01/13/87	< 0.002		1.18				0.170	< 0.002	0.008	0.008											
01/20/87	0.010	< 0.002	18.8				0.202	0.010	< 0.002												
01/27/87	0.021	0.021	0.450				0.160	< 0.002	< 0.002												
02/03/87	< 0.002		< 0.010		< 0.010		0.220	< 0.002	< 0.002												
02/10/87	< 0.002		< 0.010		< 0.010		0.370	0.300	< 0.002												
02/17/87	< 0.002		< 0.010		< 0.010		0.090		< 0.002												
02/24/87	< 0.002		< 0.010		< 0.010		0.285	< 0.002	0.010	< 0.002											
03/03/87	< 0.002		< 0.010		< 0.010		0.195	< 0.002	0.010	0.010											
03/04/87																					
03/10/87	0.065	< 0.002	2.21				0.017	< 0.002	< 0.002												
03/17/87	< 0.002		0.650				0.425	0.455	0.045	< 0.002											
03/24/87	< 0.002		< 0.010		< 0.010		0.400	< 0.002	0.040	0.040											
04/07/87	0.001	0.001	0.410				0.140	0.046	< 0.002												
04/14/87	< 0.002		< 0.010		< 0.010		0.065	< 0.002	< 0.002												
04/21/87	< 0.002		37.5		37.1		0.019	0.019	< 0.002												
04/28/87	< 0.002		< 0.010		< 0.010		0.132	0.009	< 0.002												
05/05/87	< 0.002		< 0.010		< 0.010		0.225	0.225	< 0.002												
05/12/87	< 0.002		27.3		27.3		0.127	0.018	0.022	< 0.002											

35.4% 0.00004 0.00004 0.125 0.125 < 0.002 < 0.002

36.3% 0.00260 0.00260 9.430 9.430 < 0.002 < 0.002

HEC FRANK & COMPANY, P.O. BOX 100, HARTFORD, CONNECTICUT 06101

WEEKLY WASTE MONITORING RESULTS

WASTE

DATE	DISCHARGE No. 001			DISCHARGE No. 002A			CYANIDE PRETREATMENT			PRETREATMENT WELLS			TOTAL WASTE MASS ANALYSIS				LEACHATE ANALYSIS			
	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	PERCENT SOLIDS	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE
05/19/87	< 0.002	•	10.1	•	•	•	0.390	0.020	•	< 0.002	•	•	•	•	•	•	•	•	•	•
05/26/87	< 0.002	•	< 0.010	•	•	•	0.017	0.017	•	< 0.002	•	•	•	•	•	•	•	•	•	•
06/02/87	0.010	0.010	< 0.010	•	•	•	0.177	0.117	•	< 0.002	•	•	•	•	•	•	•	•	•	•
06/09/87	< 0.002	•	< 0.010	•	•	•	0.240	0.120	•	< 0.002	•	•	•	•	•	•	•	•	•	•
06/10/87	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
06/16/87	0.040	0.008	< 0.010	•	•	•	0.160	0.140	•	0.015	0.015	•	•	•	•	•	•	•	•	•
06/23/87	< 0.002	•	51.5	23.0	•	•	0.115	0.115	•	0.002	•	•	•	•	•	•	•	•	•	•
07/07/87	< 0.002	•	2.95	•	•	•	0.155	0.125	•	0.039	0.039	•	•	•	•	•	•	•	•	•
07/14/87	< 0.002	•	1.35	•	•	•	0.275	< 0.002	•	0.007	< 0.002	•	•	•	•	•	•	•	•	•
07/21/87	0.050	0.039	< 0.010	•	•	•	0.095	0.095	•	0.035	< 0.002	•	•	•	•	•	•	•	•	•
07/28/87	< 0.002	•	< 0.010	•	•	•	0.130	0.130	•	< 0.002	•	•	•	•	•	•	•	•	•	•
08/04/87	< 0.002	•	< 0.010	•	•	•	0.165	< 0.002	•	0.020	•	•	•	•	•	•	•	•	•	•
08/11/87	< 0.002	•	< 0.010	•	•	•	0.132	0.132	•	< 0.002	•	•	•	•	•	•	•	•	•	•
08/18/87	< 0.002	•	2.150	•	•	•	0.089	< 0.002	•	< 0.002	•	•	•	•	•	•	•	•	•	•
08/25/87	< 0.002	•	< 0.010	•	•	•	0.155	0.035	•	0.105	0.072	•	•	•	•	•	•	•	•	•
09/01/87	< 0.002	•	< 0.010	•	•	•	0.210	0.010	•	0.070	0.010	•	•	•	•	•	•	•	•	•
09/08/87	0.04	0.02	< 0.010	•	•	•	0.12	< 0.002	•	< 0.002	•	•	•	•	•	•	•	•	•	•
09/15/87	< 0.002	•	< 0.010	•	•	•	0.11	< 0.002	•	< 0.002	•	•	•	•	•	•	•	•	•	•
09/18/87	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
09/22/87	< 0.002	•	< 0.010	•	•	•	0.13	0.09	•	< 0.002	•	•	•	•	•	•	•	•	•	•
10/06/87	< 0.002	•	< 0.010	•	•	•	0.52	0.45	•	0.03	0.03	•	•	•	•	•	•	•	•	•
10/13/87	0.02	< 0.002	< 0.010	•	•	•	0.02	< 0.002	•	< 0.002	•	•	•	•	•	•	•	•	•	•
10/20/87	< 0.002	•	< 0.010	•	•	•	0.11	< 0.002	•	0.04	< 0.002	•	•	•	•	•	•	•	•	•
10/27/87	< 0.002	•	0.63	•	•	•	0.04	0.04	•	< 0.002	•	•	•	•	•	•	•	•	•	•
11/03/87	0.01	< 0.002	< 0.010	•	•	•	0.01	< 0.002	•	0.01	< 0.002	•	•	•	•	•	•	•	•	•
11/10/87	0.02	< 0.002	< 0.010	•	•	•	0.06	0.06	•	0.03	0.03	•	•	•	•	•	•	•	•	•
11/17/87	< 0.002	•	< 0.010	•	•	•	0.04	0.01	•	< 0.002	< 0.002	•	•	•	•	•	•	•	•	•
11/24/87	< 0.002	•	6.5	•	•	•	0.05	0.02	•	0.02	0.02	•	•	•	•	•	•	•	•	•
12/01/87	0.06	0.06	5.0	•	•	•	0.15	0.15	•	0.01	< 0.002	•	•	•	•	•	•	•	•	•

42.7% 0.0016 0.00010 0.125 < 0.002 < 0.002 < 0.002

48.2% 0.00003 < 0.00001 0.125 < 0.002 < 0.002 < 0.002

STIMULATING CHINESE EXPORTS

DATE	DISCHARGE NO. 001		DISCHARGE NO. 002A		CYANIDE PREPARED		PREPARED MET MILL		TOTAL WASTE MASS ANALYSIS					LEACHATE ANALYSIS		
	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	PERCENT SOLIDS	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	CYANIDE TOTAL	CYANIDE AMENABLE	
12/02/87	< 0.002	*	< 0.010	**	0.04	< 0.002	0.01	< 0.002	70.08	0.00001	< 0.00001	0.182	< 0.002	< 0.002	< 0.002	
12/08/87	< 0.002	*	2.4	**	0.13	0.03	0.02	< 0.002								
12/15/87	0.01	*	0.44	**	0.14	0.04	0.01	< 0.002								
01/05/88	< 0.002	*	< 0.010	*	0.04	0.01	0.19	0.15								
01/12/88	< 0.002	*	< 0.010	*	0.17	0.01	0.05	0.03								
01/19/88	0.01	< 0.002	< 0.010	*	0.04	0.04	0.02	< 0.002								
01/26/88	< 0.002	*	< 0.010	*	0.10	0.02	< 0.002	*								
02/02/88	< 0.002	*	< 0.010	*	0.13	0.02	0.15	0.01								
02/09/88	< 0.002	*	< 0.010	*	0.10	0.02	0.01	< 0.002								
02/16/88	< 0.002	*	< 0.010	*	0.30	0.21	0.05	< 0.002								
02/23/88	0.01	< 0.002	13.1	**	0.17	< 0.002	< 0.002	*								
03/01/88	0.05	< 0.002	< 0.010	*	0.02	0.03	0.03	0.01								
03/07/88									44.58	0.00028	*	1.246	*	0.020	0.020	
03/08/88	< 0.002	*	< 0.010	*	0.76	0.02	0.01	0.01								
03/15/88	< 0.002	*	< 0.010	*	0.12	0.12	0.03	< 0.002								
03/22/88	0.01	0.01	< 0.010	*	0.15	0.02	0.02	0.02								
03/29/88	0.01	0.01	*	*	*	*	*	*								
04/05/88	< 0.002	*	13.8	**	0.12	< 0.002	< 0.002	*								
04/12/88	< 0.002	*	< 0.010	**	0.10	0.03	< 0.002	*								
04/19/88	< 0.002	*	1.80	**	0.01	< 0.002	0.01	< 0.002								
04/26/88	0.01	< 0.002	2.10	**	0.18	0.03	0.02	< 0.002								
05/03/88	< 0.002	*	0.60	**	0.02	< 0.002	0.01	< 0.002								
05/10/88	< 0.002	*	< 0.010	*	0.02	< 0.002	0.01	< 0.002								
05/17/88	< 0.002	*	< 0.010	*	0.02	< 0.002	< 0.002	*								
05/24/88	< 0.002	*	< 0.010	*	< 0.002	*	< 0.002	*								
06/02/88			< 0.010	*	< 0.002	*	< 0.002	*								
06/07/88	0.01	< 0.002	< 0.010	*	0.06	0.02	0.01	< 0.002	39.58	0.00001	*	0.119	*	< 0.002	*	
06/14/88	< 0.002	*	0.02	*	< 0.002	*	< 0.002	*								

000103

WEEKLY HYDRO MONITORING RESULTS

DATE	DISCHARGE No. 001		DISCHARGE No. 002A		CYANIDE PRETREATMENT		PRETREATMENT WET WELL		FINDA WASTE MASS ANALYSIS				LEACHATE ANALYSIS	
	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL	TOTAL PERCENT SOLIDS	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL AMENABLE	CYANIDE TOTAL AMENABLE
06/21/88	< 0.002	< 0.010	< 0.010	< 0.010	0.09	0.03	< 0.002	< 0.002						
06/28/88	< 0.002	< 0.010	< 0.010	< 0.010	0.07	0.07	0.03	0.03						
07/05/88	< 0.002	< 0.010	< 0.010	< 0.010	0.07	0.07	< 0.002	< 0.002						
07/12/88	< 0.002	< 0.010	< 0.010	< 0.010	< 0.002	< 0.002	0.01	0.01						
07/19/88	< 0.002	< 0.010	< 0.010	< 0.010	0.06	0.05	0.03	0.03						
07/26/88	0.01	< 0.002	< 0.010	< 0.010	0.15	0.01	< 0.002	< 0.002						

LEACHATE ANALYSIS: EP TOXICITY TEST METHODS USED EXCEPT THAT DISTILLED WATER WAS USED TO LEACH SLUDGE INSTEAD OF ACETIC ACID.

* : MEANS NO ANALYSIS WAS PERFORMED

** : MEANS NOT DETERMINED DUE TO COLOR INTERFERENCES

000104

ATTACHMENT C

000105



UTC PRATT & WHITNEY - NORTH HAVEN, CONNECTICUT FACILITY

WEEKLY MPDS MONITORING RESULTS			FOOD WASTE						LEACHATE ANALYSIS	
CYANIDE PRETREAT			FOOD WASTE MASS ANALYSIS							
DATE	CYANIDE TOTAL	CYANIDE AMENABLE	TOTAL PERCENT SOLIDS	CYANIDE TOTAL % DRY WT	CYANIDE AMENABLE % DRY WT	CYANIDE TOTAL mg/kg	CYANIDE AMENABLE mg/kg	CYANIDE TOTAL (mg/l)	CYANIDE AMENABLE (mg/l)	
09/09/82			32.4%	0.00780	0.00100	25.272	3.240	0.005	*	
12/01/82			29.2%	0.00490	0.00100	14.308	2.920	0.040		
03/10/83			29.9%	0.00640	0.00220	19.134	6.578	0.088	0.025	
06/07/83			30.7%	0.00760	0.00330	23.332	16.271	< 0.002	*	
09/13/83			32.9%	0.00830	0.00140	27.307	4.604	< 0.002	*	
12/09/83			33.4%	0.00680	0.00026	22.848	0.874	< 0.002	< 0.002	
03/15/84			37.8%	0.00310	0.00190	11.718	7.182	< 0.002	< 0.002	
06/20/84			80.0%	0.00648	0.00450	51.840	34.000	< 0.002	< 0.002	
09/10/84			33.1%	0.00878	0.00128	28.797	3.972	< 0.002	< 0.002	
10/02/84	0.115	0.115								
10/09/84	0.243	0.243								
10/16/84	0.058	0.058								
10/23/84	< 0.002	*								
11/06/84	0.082	*								
11/13/84	0.088	*								
11/20/84	0.049	*								
11/27/84	0.153	0.115								
12/04/84	0.043	*								
12/11/84	0.090	*								
12/13/84	*		34.7%	0.00680	0.00680	23.594	23.594	0.018	*	
12/18/84	0.143	0.143								
12/25/84	0.108	0.108								
01/03/85	0.053	*								
01/08/85	0.127	*								
01/15/85	0.091	*								
01/22/85	0.087	*								
02/05/85	0.044	*								
02/12/85	0.034	*								
02/19/85	0.016	*								
02/26/85	0.051	*								
03/05/85	0.049	*								
03/10/85			34.9%	0.00943	0.00001	34.797	0.037	< 0.002	< 0.002	
03/12/85	< 0.002	*								
03/19/85	0.093	*								
03/26/85	0.043	*								
04/02/85	0.084	*								
04/09/85	0.160	0.160								
04/16/85	0.079	*								
04/23/85	0.025	*								
05/07/85	0.110	0.110								
05/14/85	< 0.002	*								
05/21/85	< 0.002	*								
05/28/85	< 0.002	*								
06/04/85	0.043	*	28.7%	0.00099	0.00099	2.841	2.841	< 0.002	< 0.002	
06/11/85	< 0.002	*								
06/18/85	< 0.002	*								

UTC PRATT & WHITNEY NORTH HAVEN, CONNECTICUT FACILITY

WEEKLY WPOES MONITORING RESULTS			FOOD WASTE						LEACHATE ANALYSIS	
CYANIDE PRETREAT			FOOD WASTE MASS ANALYSIS							
DATE	CYANIDE TOTAL	CYANIDE AMENABLE	TOTAL PERCENT SOLIDS	CYANIDE TOTAL % DRY WT	CYANIDE AMENABLE % DRY WT	CYANIDE TOTAL mg/kg	CYANIDE AMENABLE mg/kg	CYANIDE TOTAL (mg/l)	CYANIDE AMENABLE (mg/l)	
06/25/85	< 0.002	"								
07/02/85	< 0.002	"								
07/09/85	< 0.002	"								
07/16/85	< 0.002	"								
07/23/85	< 0.002	"								
08/06/85	< 0.002	"								
08/13/85	< 0.002	"								
08/20/85	< 0.002	"								
08/27/85	0.136	0.136								
09/03/85	< 0.002	"	31.7%	0.00280	0.00280	8.876	8.876	< 0.002	< 0.002	
09/10/85	< 0.002	"								
09/17/85	< 0.002	"								
09/24/85	0.318	"								
10/01/85	0.046	"								
10/08/85	0.062	"								
10/15/85	< 0.002	"								
10/22/85	0.026	"								
11/05/85	0.061	"								
11/12/85	0.378	"								
11/19/85	0.069	"								
11/26/85	0.098	"								
12/03/85	0.043	"	27.1%	0.00221	0.00004	5.989	0.108	< 0.002	< 0.002	
12/10/85	0.059	"								
12/17/85	0.043	"								
12/23/85	0.053	"								
01/07/86	0.120	0.092								
01/14/86	0.072	"								
01/21/86	0.064	"								
01/28/86	0.026	"								
02/04/86	0.086	"								
02/11/86	0.078	"								
02/18/86	0.175	0.109								
02/25/86	0.105	0.078								
03/04/86	0.327	"								
03/11/86	0.170	0.132	32.4%	0.00045	0.00004	2.106	0.130	< 0.002	< 0.002	
03/18/86	0.210	0.201								
03/25/86	0.102	0.089								
04/01/86	0.117	0.070								
04/08/86	< 0.002	"								
04/15/86	0.017	"								
04/22/86	0.028	"								
05/06/86	0.078	"								
05/13/86	0.097	0.097								
05/20/86	0.090	"								
05/27/86	< 0.002	"								
06/03/86	0.135	0.107								

UTC PRATT & WHITNEY NORTH HAVEN, CONNECTICUT FACILITY

WEEKLY WPOES			FOOD WASTE							
MONITORING RESULTS			FOOD WASTE WBS ANALYSIS						LEACHATE ANALYSIS	
CYANIDE PRETREAT										
DATE	CYANIDE TOTAL	CYANIDE AMENABLE	TOTAL PERCENT SOLIDS	CYANIDE TOTAL % DRY WT	CYANIDE AMENABLE % DRY WT	CYANIDE TOTAL mg/kg	CYANIDE AMENABLE mg/kg	CYANIDE TOTAL (mg/L)	CYANIDE AMENABLE (mg/L)	
06/10/86	0.110	0.110	43.3%	0.00150	0.00010	6.495	0.433	< 0.002	< 0.002	
06/17/86	0.061	*								
06/24/86	0.001	*								
07/01/86	< 0.002	*								
07/08/86	0.193	0.193								
07/15/86	0.168	0.168								
07/22/86	0.290	0.141								
07/29/86	0.117	0.117								
08/05/86	0.137	0.137								
08/12/86	0.340	0.317								
08/19/86	0.600	0.280								
08/26/86	0.153	< 0.002								
09/02/86	< 0.002	*								
09/09/86	0.018	*	40.5%	0.00003	< 0.00001	0.122	< 0.002	< 0.002	< 0.002	
09/16/86	< 0.002	*								
09/23/86	0.093	0.093								
09/30/86	0.120	0.065								
10/07/86	< 0.002	*								
10/14/86	0.005	*								
10/21/86	0.071	0.071								
10/28/86	0.830	0.150								
11/04/86	< 0.002	*								
11/11/86	0.371	*								
11/18/86	0.131	0.039								
11/25/86	0.176	0.115								
12/02/86	0.043	*								
12/09/86	0.258	*								
12/16/86	0.058	*	34.4%	0.00096	0.00001	3.302	0.034	0.036	0.036	
12/23/86	0.148	< 0.002								
01/06/87	0.280	0.28								
01/13/87	0.110	< 0.002								
01/20/87	2.050	< 0.002								
01/27/87	0.043	*								
02/03/87	0.025	*								
02/10/87	0.037	*								
02/17/87	0.042	*								
02/24/87	0.040	*								
03/03/87	0.056	*								
03/10/87	0.034	*								
03/17/87	0.208	*	39.5%	0.00006	< 0.00001	0.249	< 0.002	< 0.002	< 0.002	
03/24/87	0.034	*								
03/31/87	0.048	*								
04/07/87	0.058	*								
04/14/87	0.011	*								
04/21/87	0.035	*								
04/28/87	< 0.002	*								

000108

UTC PRATT & WHITNEY - NORTH HAVEN, CONNECTICUT FACILITY

WEEKLY WPOES MONITORING RESULTS			FOOD WASTE					
			FOOD WASTE MASS ANALYSIS				LEACHATE ANALYSIS	
CYANIDE PRETREAT			TOTAL		CYANIDE		CYANIDE	
			PERCENT	TOTAL	AMENABLE	TOTAL	AMENABLE	TOTAL
DATE	TOTAL	AMENABLE	SOLIDS	% DRY WT	% DRY WT	mg/kg	mg/kg	(mg/l)
05/05/87	0.010	*						
05/12/87	0.039	*						
05/19/87	< 0.002	*						
05/26/87	0.033	*						
06/02/87	0.032	*						
06/09/87	< 0.002	*						
06/16/87	0.038	*	31.9%	0.00100	0.00100	3.190	3.190	< 0.002
06/23/87	0.042	*						< 0.002
06/30/87	< 0.002	*						
07/07/87	< 0.002	*						
07/14/87	< 0.002	*						
07/21/87	< 0.002	*						
07/28/87	0.011	*						
08/04/87	< 0.002	*						
08/11/87	0.037	*						
08/18/87	< 0.002	*						
08/25/87	< 0.002	*						
09/01/87	< 0.002	*						
09/08/87	< 0.002	*						
09/15/87	< 0.002	*	80.0%	0.00120	0.00030	7.600	2.400	< 0.002
09/22/87	< 0.002	*						< 0.002
09/29/87	< 0.002	*						
10/06/87	0.03	*						
10/13/87	0.02	*						
10/20/87	< 0.002	*						
10/27/87	0.01	*						
11/03/87	0.02	*						
11/10/87	0.05	*						
11/17/87	0.03	*						
11/24/87	0.03	*						
12/01/87	0.03	*	80.0%	0.00140	0.00090	12.800	72.000	< 0.002
12/08/87	< 0.002	*						< 0.002
12/15/87	0.02	*						
12/22/87	0.02	*						
01/05/88	0.02	*						
01/12/88	0.10	0.08						
01/19/88	0.02	*						
01/26/88	0.01	*						
02/02/88	0.02	*						
02/09/88	0.02	*						
02/16/88	0.04	*						
02/23/88	0.01	*						
03/01/88	0.06	*						
03/08/88	0.02	*	29.4%	0.00650	0.00220	19.110	6.468	< 0.002
03/15/88	0.03	*						
03/22/88	0.02	*						

UTC PRATT & WHITNEY - NORTH HAVEN, CONNECTICUT FACILITY

WEEKLY WPOES MONITORING RESULTS			FOOG WASTE					
			FOOG WASTE MASS ANALYSIS				LEACHATE ANALYSIS	
CYANIDE PRETREAT			TOTAL	CYANIDE	CYANIDE	CYANIDE	CYANIDE	CYANIDE
			PERCENT	TOTAL	AMENABLE	TOTAL	AMENABLE	TOTAL
DATE	TOTAL	AMENABLE	SOLIDS	% DRY WT	% DRY WT	mg/kg	mg/kg	(mg/l)
								(mg/l)
03/29/88	0.03	*						
04/05/88	0.34	+ 0.002						
04/12/88	+ 0.002	*						
04/19/88	0.02	*						
04/26/88	0.05	*						
05/03/88	0.03	*						
05/10/88	0.03	*						
05/17/88	+ 0.002	*						
05/24/88	+ 0.002	*						
05/31/88	0.03	*						
06/07/88	0.01	*	29.8%	0.00004	*	+ 0.119	*	+ 0.002
06/14/88	+ 0.002	*						
06/21/88	+ 0.002	*						
06/28/88	+ 0.002	*						
07/05/88	0.02	*						
07/12/88	0.02	*						
07/19/88	0.01	*						
07/26/88	0.01	*						

LEACHATE ANALYSIS: EP TOXICITY TEST METHODS USED EXCEPT THAT
DISTILLED WATER WAS USED TO LEACH SLUDGE
INSTEAD OF ACETIC ACID.

* : MEANS NO ANALYSIS WAS PERFORMED

Comment Number: II-C

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

This commenter raises two basic issues. The first issue is in reference to stabilization capacity required for F006 wastes. In the First Third final rule, the Agency set BDAT treatment standards for metals contained in F006 waste based on the performance of cementitious or pozzolanic stabilization. BDAT treatment standards are developed such that any well-designed and well-operated treatment process should be capable of achieving the standards. When developing treatment standards, the Agency also includes factors that account for performance variability. For the First Third final rule, the Agency determined that adequate commercial cementitious or pozzolanic stabilization capacity existed for F006 wastes. Generators can accumulate restricted wastes for up to 90 days, during which time they can make the proper arrangements with a commercial facility to treat their waste. As is the case with this commenter, available commercial stabilization capacity may also be used until onsite operations are designed, permitted, and constructed. Owners/operators of a hazardous waste treatment, storage, or disposal facility may store restricted wastes for sufficient time to accumulate sufficient quantities of wastes for proper treatment and recovery and to adjust their operating procedure to consistently achieve the treatment standard. Treatability variances are available for waste streams that pose a

000111

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

treatability problem. The Agency does not consider storage capacity to be vital in determining available capacity because additional storage capacity, if necessary, would be relatively easy to develop. Additionally, the Agency does not consider costs when making capacity determinations. Based on the factors described above, a national capacity variance was not granted in the First Third final rule for F006 wastes requiring stabilization.

The Agency believes that until this commenter's onsite stabilization process becomes operational, the commenter can either continue to send its F006 offsite for disposal, or if the waste stream poses a treatability problem and alternative capacity cannot be acquired, a treatability variance can be applied for.

For the Second Third proposed rule, the Agency proposed best demonstrated available technology (BDAT) treatment standards for cyanides in F006 nonwastewaters. BDAT treatment standards are developed such that any well-designed and well-operated treatment process should be capable of complying with the standards. When developing treatment standards, the Agency also includes factors that account for performance variability. The proposed cyanide treatment standards were based on performance of wet air oxidation or alkaline chlorination followed by chemical precipitation,

000112

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

settling, and filtration. In the Second Third proposed rule, the Agency also stated the belief that F006 nonwastewaters were being pretreated to below the proposed cyanide treatment standards and therefore would not require commercial cyanide treatment capacity. New performance data on the pretreatment of cyanides by alkaline chlorination also became available to EPA after the proposed rule, and the Agency has evaluated the data, and resubmitted it for public comment. The Agency also received data from several commenters indicating that the proposed cyanide treatment standards were not readily achievable. Based on the new performance data on alkaline chlorination, data received from commenters (such as the data supplied by this commenter), and other available information, the Agency reevaluated the proposed cyanide treatment standards for F006. Based on this reevaluation, the Agency has significantly raised the F006 cyanide treatment standards for the Second Third final rule (from 110 mg/kg total cyanides and 0.064 mg/kg amenable cyanides to 590 mg/kg total cyanides and 30 mg/kg amenable cyanides). The cyanide treatment standards being promulgated are based on pretreatment by alkaline chlorination followed by chemical precipitation, settling, and filtration.

000113

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

The commenter's data show 100 percent compliance with the total cyanide standard and almost this level of compliance with the amenable cyanide standard. Thus, EPA anticipates that the commenter will not need to find alternative treatment capacity for its waste.

Along with the raising of the cyanide treatment standards for the Second Third final rule, EPA performed an analysis to estimate the volume of generated F006 wastes that may exceed the promulgated cyanide standards and therefore require treatment for cyanides. The information sources EPA relied upon for this analysis were: (1) the TSDR Survey capacity data base, (2) Generator Surveys from non-TSDR facilities with exempt hazardous waste treatment capacity, (3) Generator Surveys from TSDR facilities, and (4) F006 data submitted by several commenters. The following is a summary of this analysis.

TSDR Survey

EPA screened The TSDR Survey capacity data base to identify the facilities that generated F006 and those that also had alkaline chlorination or another type of cyanide treatment onsite. It was assumed that these facilities were treating or were able to treat their wastes onsite to meet the cyanide standards and would not need commercial cyanide treatment capacity. The TSDR Surveys for the remaining TSDR facilities

000114

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

identified as generating F006 were evaluated to determine which ones generate noncyanide F006 wastes (e.g., facilities that perform chrome electroplating and therefore do not use cyanides in their process).

As a worst-case scenario, EPA assumed the remaining F006 waste streams (cyanide-bearing F006 wastes generated at facilities that did not have onsite cyanide treatment) have cyanide concentrations above the revised cyanide treatment standards.

The analysis of the TSDR Survey data showed that 104 million gallons of F006 were generated in 1986 at TSDR facilities. (This volume does not include F006 wastes generated at facilities not having a RCRA permit or interim status, i.e., non-TSDR facilities.) Of this 104 million gallons, 72 million gallons (69 percent) are generated at facilities that have onsite cyanide treatment, and 28 million gallons (27 percent) do not contain cyanides. Only 4 million gallons (4 percent) of F006 wastes were generated at these facilities that may, as a worst-case scenario, contain cyanide concentrations above the revised treatment standards. A summary of the F006 analysis conducted from the TSDR Survey capacity data base is presented in Table 1.

000115

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

Generator Survey

Data available for the F006 analysis included about 550 Generator Surveys from facilities not having a RCRA permit or interim status but with exempt hazardous waste treatment capacity onsite (non-TSDRs) and data from about 950 Generator Surveys from TSDR facilities. This limited subset of Generator Surveys was screened to identify facilities that reported generating F006 waste streams. Data were then gathered on the volumes and characteristics of each F006 waste stream, including the reported cyanide concentrations. The reported cyanide concentrations were assumed to be total cyanides.

Review of these Generator Surveys resulted in the identification of 322 facilities generating F006 waste streams. The total volume of F006 waste streams generated at the facilities in 1986 was 96 million gallons. Of this 96 million gallons, 89 million gallons (93 percent) were reported as not containing cyanides or as having cyanide concentrations below the revised total cyanide treatment standard; 7 million gallons (7 percent) were reported as either being of unknown cyanide content, to contain cyanides at unknown concentrations, or to have cyanide concentrations above the revised total cyanide treatment standard. However, generators reported that less than 1.6 percent of the volume of the F006 waste at

000116

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

these facilities had a cyanide concentration above the treatment standard or had cyanides with unknown concentration levels. These data corroborate EPA's conclusions that the total cyanide standard is achievable by application of treatment already existing at generators' facilities. In addition, several of the facilities with unknown cyanide concentrations have onsite cyanide treatment. If it is assumed that these waste streams would meet the BDAT standard, then less than 0.7 percent of the F006 wastes from Generator Survey facilities would require cyanide treatment capacity.

Data from Public Comments

In the public comments for the Second Third proposed rule, the Agency received data from two commenters on cyanide concentrations in F006 waste streams. The data supplied by one commenter, The National Association of Metal Finishers, included data from PDC Laboratories, Inc. (LD10-00024.A) on the total cyanide concentrations in 88 F006 waste stream samples from a variety of generators. Of the reported 88 waste streams, only 8 waste streams (9 percent) had total cyanide concentrations above the revised treatment standard. The commenter did not supply information on waste stream volumes or conditions of treatment.

000117

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

This commenter supplied total and amenable cyanide concentration data on samples from F006 wastes generated at two of its facilities. Upon review of the data, the Agency found that none of the 47 samples for which data were supplied had total cyanide concentrations above the revised treatment standard, and only 2 out of the 47 samples (4 percent) had amenable cyanide concentrations above the revised treatment standard. One sample reported by the commenter was not considered by the Agency. This sample was assumed to have been erroneously reported because the amenable cyanide concentration was greater than the total cyanide concentration. Waste stream volume information was not supplied by the commenter.

Conclusions

A summary of the cyanide concentration data from the Generator Survey and commenter information used to support the F006 analysis is presented in Table 2. Although only data from a subset of F006 generators have been evaluated, it is believed that these data establish that only a small percentage of all F006 wastes will have cyanide concentrations above the revised treatment standards (i.e., only a small percentage of a volume of F006 wastes with cyanides and without cyanides). If EPA considered only

000118

Table 2 Summary of Cyanide Concentration Data Supporting the F006 Analysis

Data source	Number of F006 generating facilities	Total volume of F006 waste streams	Volume of F006 waste streams failing final treatment standards (percent of total volume)	Volume of F006 waste streams with cyanides, but at an unknown concentration (percent of total volume)	Comments
Generator Surveys	322	96 Mgal	0.4 Mgal (<1%)	1.1 Mgal (<1%)	The actual volume of waste streams either failing final treatment standards or containing cyanides, but at an unknown concentration is 1,475,520 gallons of F006
National Association of Metal Finishers data	^a	Unknown	^a	NA	F006 waste stream volume information was not provided
United Technologies (Prett & Whitney)	^a	Unknown	^b	NA	F006 waste stream volume information was not provided

^a The number given is the number of F006 waste samples analyzed.

^a Eight F006 waste samples (9 percent) had concentrations above the revised total cyanide standard.

^b None of the F006 waste samples had concentrations above the revised total cyanide standard; 2 of the 47 (4 percent) had amenable cyanide concentrations above the revised standard.

Mgal = million gallons.

NA = Not applicable.

000119

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

the volumes of F006 wastes that had cyanides, the percentage of wastes that would exceed the standard would obviously increase. However, the volume of the land disposed waste includes all F006 wastes land disposed (i.e., volumes with and without cyanides). Thus the appropriate percentage for determination of the volume of land disposed waste that would exceed the standard is the percentage of all F006 wastes that exceed the standards. The data from the TSDR Survey, Generator Survey, and commenters consistently indicate that the percentage of all F006 wastes that may exceed the standard is small, ranging from a low of about 1 percent to a high of about 10 percent. As a worst-case scenario, the Agency estimates that 10 percent of the F006 wastes generated may have cyanide concentrations above the revised treatment standards.

Estimates of required capacity for the land disposal restrictions are based on the volume of waste land disposed, not the volume generated. For the First Third final rule, EPA estimated that 129 million gallons per year of land disposed F006 wastes require alternative treatment. Using the assumption that the percentage of F006 generated that contains cyanide concentrations above the revised treatment standards is representative of

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

the percentage of land disposed F006 waste that contains cyanide concentrations above these standards, the Agency estimates, as a worst-case scenario, that 10 percent of the 129 million gallons of F006 waste land disposed, or about 13 million gallons per year, will require alternative commercial capacity for cyanides. Sufficient alkaline chlorination capacity (46 million gallons per year) exists to treat this volume of waste.

The supplemental information supplied by this commenter (and included in the Agency's F006 capacity analysis) indicated that 10 out of 15 samples could not pass the proposed treatment standards for cyanides. However, as previously described, the Agency found that only 2 samples out of 47, or about 4 percent, would not pass the revised amenable cyanide treatment standards being promulgated in the Second Third final rule.

The Agency acknowledges that some F006 waste streams will require alternative treatment for cyanides. However, based on the reevaluation of the cyanide treatment standards for F006 and the capacity analysis done using TSDR and Generator Survey information, the Agency believes that adequate treatment capacity exists for the estimated 13 million gallons per year of F006 wastes requiring cyanide treatment. The Agency estimates

Comment Number: II-C (continued)

Docket Number: LD10-L0004

Commenter: United Technologies, Pratt & Whitney

Response:

that 46 million gallons per year of cyanide treatment capacity is available for Second Third wastes.

As previously described in reference to stabilization capacity, the Agency does not consider storage capacity to be vital in determining available capacity because additional storage capacity would be relatively easy to develop. Also, the Agency does not consider cost when making capacity determinations. Treatability variances are available for generators of F006 waste streams that cannot be treated to meet treatment standards after properly conducted treatment. Based on the information contained in this response on stabilization and cyanide treatment, the Agency does not believe that a capacity variance is necessary for F006 wastes requiring cyanide treatment and/or stabilization.

Furthermore, generators can accumulate restricted wastes for up to 90 days, during which time they can make the proper arrangements with a commercial facility to treat their wastes. The available commercial capacity may also be used until onsite operations are designed, permitted, and constructed. Owners/operators of a hazardous waste treatment, storage, or disposal facility may store restricted wastes for sufficient time to accumulate sufficient quantities of wastes for proper treatment and recovery and to adjust their operating procedure to consistently achieve the treatment standard.

000122



Comment Number: I-D

Docket Number: LD10-L0024

Commenter: Ford Motor Co.

Comment:

1. EPA Should Determine Availability of Nationwide Capacity

When EPA first proposed treatment standards for hazardous wastes containing cyanide in the January 11, 1989 Federal Register, Ford Motor Company contacted CyanoKem and arranged for samples of cyanide-bearing wastewater treatment sludges from two of our facilities to be shipped to CyanoKem for treatability studies. We were interested in the treatability of our waste streams (which contain significant concentrations of complexed iron cyanide), in meeting the proposed treatment levels. Significant in-house attempts using alkaline chlorination of our waste streams were unsuccessful. CyanoKem explained that their process was primarily alkaline chlorination, but that certain other proprietary aspects of their process (which they indicated they were not at liberty to discuss with us) may provide improved results. After many unreturned telephone calls to CyanoKem we have not been successful in either (1) obtaining the results of the CyanoKem process on our waste streams, or (2) meeting with CyanoKem to discuss the details of their process.

We caution EPA that before setting treatment standards apparently based on data from a single firm, that EPA review its databases to determine (1) if other commercial TSDFs or on-site generating facilities are in fact capable of achieving this level of cyanide reduction, and (2) if the treatment technologies employed are similar. Otherwise, EPA may erroneously establish treatment standards based on the alleged operations of a single commercial facility, where nationwide treatment capacity for that level/type of treatment may not be available.

2. Treatment of Metal Finishing Sludges Prior to Dewatering

CyanoKem states in its comments that sludge dewatering is merely a physical treatment method and that EPA should select a BDAT treatment method which requires that a treatment step be inserted prior to dewatering. If this approach is followed, such treatment should be available for implementation by waste generators on-site. Transportation of slurries off-site for alkaline oxidation commercially would increase costs significantly, due to increased volumes of slurries as compared to filter cake, as well as increase the risks associated with transportation mishaps (increase volumes being transported, and liquid vs. solid form). Waste minimization efforts such as filter pressing to reduce volumes would be negated. Treated slurries might then need to be transported back to the generator (a RCRA permit would be required) or to another TSDF for dewatering prior to landfilling. If EPA were to require on-site cyanide treatment, enough time must be allowed to design and install such facilities.

We understand that currently CyanoKem can only accept waste in either a slurry form or in 1 cubic yard quantities of filter cake.

000123

Comment Number: II-D

Docket Number: LD10-L0024

Commenter: Ford Motor Co.

Response:

In the Second Third proposed rule, the Agency proposed BDAT treatment standards for cyanides in F006 nonwastewaters. The proposed cyanide treatment standards were based on available information on pretreatment by wet air oxidation or alkaline chlorination followed by chemical precipitation, settling, and filtration.

After the Second Third proposed rule was published (January 11, 1989), the Agency received new performance data on the pretreatment of F006 nonwastewaters for cyanides using alkaline chlorination. The Agency also received data from several commenters indicating that the proposed cyanide treatment standards were not readily achievable. Utilizing the new performance data on alkaline chlorination, data received from commenters, and other available information, the Agency reevaluated the proposed cyanide treatment standards for F006. Based on this reevaluation, the Agency has significantly raised the F006 cyanide treatment standards for the Second Third final rule (from 110 mg/kg total cyanides and 0.064 mg/kg amenable cyanides to 590 mg/kg total cyanides and 30 mg/kg amenable cyanides). The treatment standards being promulgated are based on pretreatment by alkaline chlorination followed by chemical precipitation, settling, and filtration.

000124

Comment Number: II-D (continued)

Docket Number: LD10-L0024

Commenter: Ford Motor Co.

Response:

The revised cyanide treatment standards were not based solely on data from a single firm, as indicated by this commenter. The Agency used all available information to develop the revised standards. The revised cyanide BDAT treatment standards were developed such that any well-designed and well-operated treatment process should be capable of complying with the standards. Additionally, when developing treatment standards, the Agency includes factors that account for performance variability. Therefore, the Agency believes that the 46 million gallons per year of nationwide commercial alkaline chlorination capacity identified from the TSDR Survey capacity data base will be capable of achieving the revised cyanide standards.

The Agency estimates that, as a worst-case scenario, 13 million gallons per year of F006 wastes may require commercial cyanide treatment. The TSDR Survey capacity data base indicates that adequate alkaline chlorination capacity exists for this volume of waste. Factors such as transportation and increased costs are not considered by the Agency when making capacity determinations.

Finally, generators can accumulate restricted wastes for up to 90 days, during which time they can make the proper arrangements with a commercial facility to treat their wastes. The available commercial

000125

Comment Number: II-D (continued)

Docket Number: LD10-L0024

Commenter: Ford Motor Co.

Response:

capacity may also be used until onsite operations are designed, permitted, and constructed. Owners/operators of a hazardous waste treatment, storage, or disposal facility may store restricted wastes for sufficient time to accumulate sufficient quantities of wastes for proper treatment and recovery and to adjust their operating procedure to consistently achieve the treatment standard.

000126

Comment Number: II-E

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Comment:

The preceding scenario makes the proposed rule calculations statistically invalid. The Michigan Association of Metal Finishers (comprising of 61 companies) recommends increasing the cyanide treatability level from 110 mg/kg to 2000 mg/kg and a two year extension date is sought for final rule implementation based on representative filler cake analysis data results.

000127

Comment Number: II-E

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Response:

For the Second Third proposed rule, the Agency proposed best demonstrated available technology (BDAT) treatment standards for cyanides in F006 nonwastewaters. BDAT treatment standards are developed such that any well-designed and well-operated treatment process should be capable of complying with the standards. When developing treatment standards, the Agency also includes factors that account for performance variability. The proposed cyanide treatment standards were based on performance of wet air oxidation or alkaline chlorination followed by chemical precipitation, settling, and filtration. In the Second Third proposed rule, the Agency also stated the belief that F006 nonwastewaters were being pretreated to below the proposed cyanide treatment standards and therefore would not require commercial cyanide treatment capacity. New performance data on the pretreatment of cyanides by alkaline chlorination also became available to EPA after the proposed rule, and the Agency has evaluated the data. The Agency also received data from several commenters indicating that the proposed cyanide treatment standards for F006 nonwastewaters were not readily achievable. Based on the new performance data on alkaline chlorination, data received from commenters (such as the data supplied by this commenter), and other available information, the Agency reevaluated the proposed cyanide treatment standards for F006. Based on

000128

Comment Number: II-E (continued)

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Response:

this reevaluation, the Agency has significantly raised the F006 cyanide treatment standards for the Second Third final rule (from 110 mg/kg total cyanides and 0.064 mg/kg amenable cyanides to 590 mg/kg total cyanides and 30 mg/kg amenable cyanides). The cyanide treatment standards being promulgated are based on pretreatment by alkaline chlorination followed by chemical precipitation, settling, and filtration.

Along with raising of the cyanide treatment standards for the Second Third final rule, EPA performed an analysis to estimate the volume of generated F006 wastes that may exceed the promulgated cyanide standards and therefore require treatment for cyanides. The information sources EPA relied upon for this analysis were: (1) the TSDR Survey capacity data base, (2) Generator Surveys from non-TSDR facilities with exempt hazardous waste treatment capacity, (3) Generator Surveys from TSDR facilities, and (4) F006 data submitted by several commenters. The following is a summary of this analysis.

TSDR Survey

EPA screened The TSDR Survey capacity data base to identify the facilities that generated F006 and those that also had alkaline chlorination or another type of cyanide treatment onsite. It was assumed

000129

Comment Number: II-E (continued)

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Response:

that these facilities were treating or were able to treat their wastes onsite to meet the cyanide standards and would not need commercial cyanide treatment capacity. The TSDR Surveys for the remaining TSDR facilities identified as generating F006 were evaluated to determine which ones generate noncyanide F006 wastes (e.g., facilities that perform chrome electroplating and therefore do not use cyanides in their process).

As a worst-case scenario, EPA assumed the remaining F006 waste streams (cyanide-bearing F006 wastes generated at facilities that did not have onsite cyanide treatment) have cyanide concentrations above the revised cyanide treatment standards.

The analysis of the TSDR Survey data showed that 104 million gallons of F006 were generated in 1986 at TSDR facilities. (This volume does not include F006 wastes generated at facilities not having a RCRA permit or interim status, i.e., non-TSDR facilities.) Of this 104 million gallons, 72 million gallons (69 percent) are generated at facilities that have onsite cyanide treatment, and 28 million gallons (27 percent) do not contain cyanides. Only 4 million gallons (4 percent) of F006 wastes were generated at these facilities that may, as a worst-case scenario, contain cyanide concentrations above the revised treatment standards. A summary of the F006 analysis conducted from the TSDR Survey capacity data base is presented in Table 1.

000130

Comment Number: II-E (continued)

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Response:

Generator Survey

Data available for the F006 analysis included about 550 Generator Surveys from facilities not having a RCRA permit or interim status but with exempt hazardous waste treatment capacity onsite (non-TSDRs) and data from about 950 Generator Surveys from TSDR facilities. This limited subset of Generator Surveys was screened to identify facilities that reported generating F006 waste streams. Data were then gathered on the volumes and characteristics of each F006 waste stream, including the reported cyanide concentrations. The reported cyanide concentrations were assumed to be total cyanides.

Review of these Generator Surveys resulted in the identification of 322 facilities generating F006 waste streams. The total volume of F006 waste streams generated at the facilities in 1986 was 96 million gallons. Of this 96 million gallons, 89 million gallons (93 percent) were reported as not containing cyanides or as having cyanide concentrations below the revised total cyanide treatment standard; 7 million gallons (7 percent) were reported either as being of unknown cyanide content, to contain cyanides at unknown concentrations, or to have cyanide concentrations above the revised total cyanide treatment standard. However, generators reported that less than 1.6 percent of the volume of the F006 waste at

000131

Comment Number: II-E (continued)

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Response:

these facilities had a cyanide concentration above the treatment standard or had cyanides with unknown concentration levels. These data corroborate EPA's conclusions that the total cyanide standard is achievable by application of treatment already existing at generators' facilities. In addition, several of the facilities with unknown cyanide concentrations have onsite cyanide treatment. If it is assumed that these waste streams would meet the BDAT standard, then less than 0.7 percent of the F006 wastes from Generator Survey facilities would require cyanide treatment capacity.

Data from Public Comments

In the public comments for the Second Third proposed rule, the Agency received data from two commenters on cyanide concentrations in F006 waste streams. The data supplied by one commenter, The National Association of Metal Finishers, included data from PDC Laboratories, Inc. (LD10-00024.A) on the total cyanide concentrations in 88 F006 waste stream samples from a variety of generators. Of the reported 88 waste streams, only 8 waste streams (9 percent) had total cyanide concentrations above the revised treatment standard. The commenter did not supply information on waste stream volumes or conditions of treatment.

000132

Comment Number: II-E (continued)

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Response:

The other commenter, United Technologies, Pratt & Whitney, supplied total and amenable cyanide concentration data on samples from F006 wastes generated at two of its facilities. Upon review of the data, the Agency found that none of the 47 samples for which data were supplied had total cyanide concentrations above the revised treatment standard, and only 2 out of the 47 samples (4 percent) had amenable cyanide concentrations above the revised treatment standard. One sample reported by the commenter was not considered by the Agency. This sample was assumed to have been erroneously reported because the amenable cyanide concentration was greater than the total cyanide concentration. Waste stream volume information was not supplied by the commenter.

Conclusions

A summary of the cyanide concentration data from the Generator Survey and commenter information used to support the F006 analysis is presented in Table 2. Although only data from a subset of F006 generators have been evaluated, it is believed that these data establish that only a small percentage of all F006 wastes will have cyanide concentrations above the revised treatment standards (i.e., only a small percentage of a volume of F006 wastes with cyanides and without cyanides). If EPA considered only

000133

Comment Number: II-E (continued)

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Response:

the volumes of F006 wastes that had cyanides, the percentage of wastes that would exceed the standard would obviously increase. However, the volume of the land disposed waste includes all F006 wastes land disposed (i.e., volumes with and without cyanides). Thus the appropriate percentage for determination of the volume of land disposed waste that would exceed the standard is the percentage of all F006 wastes that exceed the standards. The data from the TSDR Survey, Generator Survey, and commenters consistently indicate that the percentage of all F006 wastes that may exceed the standard is small, ranging from a low of about 1 percent to a high of about 10 percent. As a worst-case scenario, the Agency estimates that 10 percent of the F006 wastes generated may have cyanide concentrations above the revised treatment standards.

Estimates of required capacity for the land disposal restrictions are based on the volume of waste land disposed, not the volume generated. For the First Third final rule, EPA estimated that 129 million gallons per year of land disposed F006 wastes require alternative treatment. Using the assumption that the percentage of F006 generated that contains cyanide concentrations above the revised treatment standards is

Comment Number: II-E (continued)

Docket Number: LD10-L0030

Commenter: Michigan Association of Metal Finishers

Response:

representative of the percentage of land disposed F006 waste that contains cyanide concentrations above these standards, the Agency estimates, as a worst-case scenario, that 10 percent of the 129 million gallons of F006 waste land disposed, or about 13 million gallons per year, will require alternative commercial capacity for cyanides. Sufficient alkaline chlorination capacity (46 million gallons per year) exists to treat this volume of waste.

000135

CATEGORY III
LAB PACK WASTES

000136

Comment Number: III - A

Boxer Number: LD10-00046

Commenter: Peter Ashbrook

Comment:

Lastly, the EPA should note that there are not very many off-site treatment facilities for laboratory wastes (labpacks). There are four incinerators and one treatment facility we have used in the last three years. That treatment facility (CyanoKem in Detroit) is no longer accepting labpacks for treatment. I am not sure what options are open at this point for those laboratory chemicals that cannot be incinerated. Having the option of on-site treatment would greatly help.

000137

Comment Number: III-A

Docket Number: LD10-00046

Commenter: Peter Ashbrook

Response:

Based on the results of the TSDR Survey, the Agency estimates that less than 8,000 gallons of lab pack wastes will require alternative treatment as a result of the Second Thirds rule. Lab packs are typically an assortment of various small volumes of packaged chemicals. Because each chemical can vary in treatability, some special handling may be required in order to package together only chemicals that have similar treatability. The Agency believes that if packaged properly lab packs will not cause a treatability problem. TSDR Survey data indicate that adequate commercial treatment capacity does exist for the small volume of lab pack waste requiring alternative treatment. Therefore, a capacity variance cannot be granted for lab pack wastes.

000138

CATEGORY IV
SOLIDS INCINERATION CAPACITY

000139

Document Number: IV-A

Project Number: LD10-00026

Commentary: Sterling Chemicals, INC.

Comment:

3. Real world experience has demonstrated that drummed and bulk solid hazardous waste handling and incineration capacity is not sufficient at this time.

Sterling has evaluated rotary kiln incinerator capacity across the country as part of the soft hammer provisions on K011 and K013 nonwastewaters. We have been unable to find incinerator capacity to handle this bulk solid waste. Rotary kiln incinerators contacted essentially require that bulk solid wastes be drummed prior to incineration. Drumming the wastes is also not a solution since the same rotary kiln incinerators are not able to handle the current drummed waste load. Sterling's experience has been that, in general terms, waste generation rates exceed the waste destruction rate. Thus, waste inventories at incinerator storage areas are overwhelming incinerator operating storage areas.

New rotary kiln incinerators are under construction at this time. However, permitting delays, vocal public opposition and construction and operation difficulties are delaying these projects. It is unlikely that any of the new incinerators will significantly impact bulk solid waste incinerator capacity in 1989. Some capacity may come on line in mid-1990, but what impact it will have is unknown.

The Agency must complete a true survey of available capacity. Such a survey must take into consideration all factors including current loading of hazardous and nonhazardous wastes, client surveys to establish whether capacity is available, bulk handling facilities, focusing on bulk solid waste handling, and actual timing of new unit construction and full scale operation. If the Agency is going to mandate incineration to the organic chemical industry, it must not require it until such incineration is available and handling facilities are associated with it to deal with difficult to handle bulk wastes.

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000140

Comment Number: IV-A

Docket Number: LD10-00026

Commenter: Sterling Chemicals Inc.

Response:

The Agency disagrees with the commenter that drummed and bulk solid hazardous waste handling and incineration capacity is not sufficient at this time. In response to this comment, the Agency reviewed the analysis of commercial incinerators that had reported solids capacity in the TSDR Survey to specifically evaluate their solids handling capabilities. As a result of this analysis, the Agency believes there is limited but adequate incineration capacity for bulk and drummed solids. At the currently operating commercial incinerators that reported solids capabilities, two accept only bulk solids, five accept only drummed solids, and five accept both bulk and drummed solids. (See Table 1.) Prior to the land disposal restriction rules, the available solids capacity was 7.3 million gallons per year at facilities that handle only bulk solids, 3.1 million gallons per year at facilities that handle only drummed solids, and 22.8 million gallons per year at facilities that handle both bulk and drummed solids. The current total available capacity for solids incineration, accounting for the effects of previous land disposal restriction rules (not including the Second Third wastes), is 13.2 million gallons. Thus, EPA concludes that there is currently adequate national capacity for drummed and bulk

000141

Comment Number: IV-A (continued)

Docket Number: LD10-00026

Commenter: Sterling Chemicals Inc.

Response:

solid wastes. EPA does recognize that for bulk solids and drummed solids incineration there may be materials handling and cost-related issues. However, factors such as cost and materials handling and transportation requirements are not to be considered by the Agency when making national capacity determinations. If a facility cannot find capacity for solids incineration, it may apply for a case-by-case extension.

Only planned solids capacity that was verified through facility contact to be operational by the time that the Second Third rule is promulgated was considered in this analysis. Planned capacity reported in the TSDR Survey for solids incineration that will be delayed from coming online because of permitting delays, public opposition, and construction delays was not included in the analysis. In making national capacity determinations for future rulemakings, the Agency will continue to consider only capacity that is verified to be online by the time of promulgation.

000142

Comment Number: IV-8

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc.

Comment:

It should be recognized that similar problems may arise with solid wastes for which incineration capacity is claimed, for example. While incinerator operators may claim significant throughput capacity of their units, our experience is that commercial facilities are extremely limited in their ability to handle and feed bulk solids, and have limited capacity to store drums. Many require that wastes be drummed for burning. Generators will have serious difficulties in providing the facilities to safely drum, store and transport such wastes. For example, KD48-52 wastes will require 2.8 million drums per year and toxicity characteristic wastes conceivably twice as many more if all drums were necessary. Consequently, in future rulemaking, EPA must pay serious attention to the actual materials handling capacity of both the generator and disposer in determining available capacity.

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000143

Comment Number: IV-8

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc.

Response:

The Agency acknowledges the commenter's concern that available incineration capacity for solid hazardous wastes will be affected by future rulemakings and the termination of national capacity variances. However, the factors mentioned by the commenter do not yet affect available national capacity and thus are not evaluated for this rulemaking. K048-K052 wastes have been granted a national capacity variance until August of 1990, and the toxicity characteristic wastes have not yet been promulgated. The Agency will analyze the effects of these rulemakings in determining the available capacity for future land disposal restriction rules.

For purposes of the Second Third rule, the Agency believes that there is limited but adequate incineration capacity for bulk and drummed solids. The Agency reviewed its analysis of commercial incineration that had reported solids capacity in the TSDR Survey to specifically evaluate their solids handling capabilities. At the currently operating commercial incinerators that reported solids capabilities, 2 accept only bulk solids, 5 accept only drummed solids, and 5 accept both bulk and drummed solids. (See Table 1.) Prior to the land disposal restriction rules, the available solids capacity was 7.3 million gallons per year at facilities

Comment Number: IV-B (continued)

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc.

Response:

that handle only bulk solids, 3.1 million gallons per year at facilities that handle only drummed solids, and 22.8 million gallons per year at facilities that handle both bulk and drummed solids. The current total available capacity for solids incineration, accounting for the effects of previous land disposal restriction rules (not including the Second Third wastes), is 13.2 million gallons. Thus, EPA concludes that there is currently adequate national capacity for drummed and bulk solid wastes. EPA does recognize that for bulk solids and drummed solids incineration there may be materials handling and cost-related issues. However, factors such as cost and materials handling and transportation requirements are not to be considered by the Agency when making national capacity determinations. If a facility cannot find capacity for solids incineration, it may apply for a case-by-case extension.

Only planned solids capacity that was verified through facility contact to be operational by the time that the Second Third rule is promulgated was considered in this analysis. Planned capacity reported in the TSDR Survey for solids incineration that will be delayed from coming online because of permitting delays, public opposition, and construction

000145

Comment Number: IV-B (continued)

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc.

Response:

delays was not included in the analysis. In making national capacity determinations for future rulemakings, the Agency will continue to consider only capacity that is verified to be online by the time of promulgation.

The Agency does not consider storage capacity to be vital in determining available capacity because additional storage capacity, if necessary, would be relatively easy to develop.

000146

CATEGORY V
AVAILABLE TREATMENT CAPACITY

000147

Comment Number: V - A

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc.

Comments:

H. Available Treatment Capacity Is Over Stated Because It Does Not Account For Treatment Needed For Second Third Soft Hammered Wastes

In order for a generator to continue to dispose of soft hammered waste in landfills and surface impoundments after the date EPA was scheduled to establish prohibitions, the landfill or impoundment must meet the minimum technology requirements and the generator must certify that such disposal is the only practical alternative to treatment currently available. These certification requirements force generators of first third and second third soft hammered wastes to compete for treatment capacity that would enable prohibited wastes to meet RCAT treatment standards. EPA recognizes the need to account for this capacity utilization for surface land disposed volumes of soft hammer first third wastes (see Ref. LD10-14 - Background Document). However, EPA does not evaluate the volumes of wastes for eight "X" wastes, sixteen "P" wastes and eighty-one "U" wastes.

Since there are no hierarchical requirements for commercial facilities to accept one type of listed waste over another, the result of the certification is that the generators who are able to contract first will be the ones that obtain available capacity. Some generators who must meet RCAT requirements may find that no capacity is available. Therefore, EPA should assume second third (and first third) soft hammer wastes will utilize capacity and then determine if treatment capacity is available for wastes subject to this rule. If capacity is not available, the Agency should grant extensions.

Comment Number: V-A

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc. (CMA)

Response:

The Agency acknowledges that the volume of First Third and Second Third soft hammer wastes requiring alternative treatment should be analyzed in order to evaluate the impact on available capacity for restricted wastes. The Agency realizes that there are no hierarchical requirements for commercial facilities to accept restricted wastes before other types of waste. Therefore, for the Second Third final rule, the Agency has performed a capacity analysis of First Third and Second Third soft hammer wastes to determine their effects on available capacity. The following is a summary of this analysis.

EPA's National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities (the TSDR Survey) was used to perform the capacity analysis. Tables 1 and 2 present summaries of the capacity analyses performed for First Third and Second Third nonsoil soft hammer wastes. Tables 3 and 4 present summaries of the capacity analyses performed for soils contaminated with First Third and Second Third soft hammer wastes. These tables list the types of treatment technologies believed to be applicable to these wastes as well as the available and required capacities. The available capacity listed for each technology is the treatment capacity available after treatment of restricted wastes (i.e., spent solvents, California List HOCs, First Third promulgated

000149

Comment Number: V-A (continued)

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc. (CMA)

Response:

wastes, and Second Third promulgated wastes). As indicated in the tables, adequate available treatment capacity exists for these soft hammer wastes except for nonsoil wastes requiring wastewater treatment for organics, mercury retorting, or vitrification. The TSDR Survey capacity data base indicates that no commercial mercury retorting or vitrification capacity exists. Therefore, certification as to the lack of practically available mercury retorting and vitrification capacity would not be difficult. The waste streams assigned to wastewater treatment for organics are predominantly large-volume underground injected waste streams. Of the total volume of First Third and Second Third soft hammer wastes assigned to wastewater treatment for organics (1,410 million gallons per year), approximately 1,396 million gallons per year, or 99 percent, are from large-volume underground injected waste streams. The volume of each of these waste streams is over 27 million gallons per year. Because the total volume of these waste streams significantly exceeds the amount of available capacity and because each of these waste streams would require over one-half of the available treatment capacity (total available capacity is 50 million gallons per year), it is believed that certifying a lack of practically available treatment capacity, if necessary, would not be difficult. Therefore, the generators of these waste streams would not

000150

Comment Number: V-A (continued)

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc. (CMA)

Response:

be forced to compete for alternative treatment capacity. Additionally, the estimated volume of Second Third promulgated wastes requiring wastewater treatment for organics is very small (less than 1 million gallons per year).

Based on this capacity analysis performed on First Third and Second Third soft hammer wastes, it is believed that the only soft hammer waste streams that may exceed available alternative treatment capacity are the large-volume underground injected waste streams that would require wastewater treatment for organics. However, as previously described, there is a severe capacity shortfall for these waste streams. The generators of these waste streams should have no problem certifying a lack of practically available capacity. Therefore, it is believed that the potential utilization of available treatment capacity for First Third and Second Third soft hammer wastes would not deplete available capacity to the point where sufficient capacity is not available for Second Third promulgated wastes.

EPA recognizes that soft hammer wastes that are sent to sludge/solid incineration will reduce the amount of capacity available for other restricted wastes. However, analysis indicates that although the available capacity is limited, there is currently adequate sludge/solid

Comment Number: V-A (continued)

Docket Number: LD10-00034

Commenter: Chemical Manufacturers Assoc. (CMA)

Response:

incineration capacity for both restricted wastes and soft hammer wastes.
For future rules, EPA will continue to evaluate the impact of soft hammer
wastes.

000152

Table 1 Capacity Analysis for First Third Nonsoil Soft Hammer Wastes

Technology	Current available capacity ^a (million gallons/year)	Required capacity (million gallons/year)	
		Volume surface land disposed	Volume underground injected
Combustion of liquids	250	<1	30
Combustion of sludges/solids	8	1	<1
Wastewater treatment			
- Wastewater treatment for organics	50	<1	1,304
- Cyanide destruction	29 ^b	6	0
- Chromium reduction	109	1	<1
- Neutralization	36	<1	<1
- Chemical precipitation	3,010	<1	<1
- Sulfide precipitation	252	<1	0
Stabilization	511	13	<1
Mercury retorting	0	<1	0
Vitrification	0	<1	0
Management of lab pack wastes	^c	<1	<1
Totals		21	1,334

^a Capacity given is the current available capacity after treatment of the estimated volumes of restricted wastes requiring alternative treatment (i.e., spent solvents, California List HOCs, First Third promulgated wastes, and Second Third promulgated wastes).

^b Available capacity has also been adjusted to account for 13 million gallons per year of capacity that may be needed for F006 wastes.

^c Lab pack wastes will require several different treatment technologies including incineration and wastewater treatment. Because of the small volume (5,840 gallons), adequate treatment capacity is considered to be available.

Table 2 Capacity Analysis for Second Third Nonsoil Soft Hammer Wastes

Technology	Current available capacity ^a (million gallons/year)	Required capacity (million gallons/year)	
		Volume surface land disposed	Volume underground injected
Combustion of liquids	250	<1	28
Combustion of sludges/solids	8	2	0
Wastewater treatment			
- Wastewater treatment for organics	50	0	106
- Chromium reduction	109	0	<1
Stabilization	511	<1	0
Management of lab pack wastes	b	<1	<1
Totals		2	134

^a Capacity given is the current available capacity after treatment of the estimated volumes of restricted wastes requiring alternative treatment (i.e., spent solvents, California List HOCs, First Third promulgated wastes, and Second Third promulgated wastes).

^b Lab pack wastes will require several different treatment technologies including incineration and wastewater treatment. Because of the small volume (10,320 gallons), adequate treatment capacity is considered to be available.

000134

Table 3 Capacity Analysis for Soils Contaminated with
First Third Soft Hammer Wastes

Technology	Current available capacity ^a (million gallons/year)	Required capacity (million gallons/year)	
		Volume surface land disposed	Volume underground injected
Combustion of sludges/solids	8	3	<1
Stabilization	511	1	0
Vitrification	0	<1	0
Mercury retorting	0	<1	0
Totals		4	<1

^a Capacity given is the current available capacity after treatment of the estimated volumes of restricted wastes requiring alternative treatment (i.e., spent solvents, California List HOCs, First Third promulgated wastes, and Second Third promulgated wastes).

000155

Table 4 Capacity Analysis for Soils Contaminated with
Second Third Soft Hammer Wastes

Technology	Current available capacity ^a (million gallons/year)	Required capacity (million gallons/year)	
		Volume surface land disposed	Volume underground injected
Combustion of sludges/solids	8	1	0
Stabilization	511	<1	0
Vitrification	0	<1	0
Totals		1	0

^a Capacity given is the current available capacity after treatment of the estimated volumes of restricted wastes requiring alternative treatment (i.e., spent solvents, California List HOCs, First Third promulgated wastes, and Second Third promulgated wastes).

000156

CATEGORY VI
MISCELLANEOUS CAPACITY COMMENTS

000157

Comment Number: VI - A

Project Number: LD10-00054

Commenter: THE CHLORINE INSTITUTE, INC.

Comment:

- L. Types and quantities of D009 wastes generated by mercury cell chlor-alkali producers.

A survey of generation of D009 wastes was conducted among Institute members. The results of that survey are given in Table I. Total generation is only about 4,000 tons per year. Estimations indicate that only 10 to 50 percent of the D009 wastes are possibly treatable materials; the balance are miscellaneous items possibly contaminated with mercury including wood, fiberglass, rubber, dirt, gloves, concrete, old piping, tanks, etc., that are automatically declared by industry as D009 waste because of the virtual impossibility of the collection of representative samples for analysis of the mercury content.

000158

Comment:

1000

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PAGE FIVE FROM THEIR SISTER'S, MARY, DIED, CONSIDERED, SUCCESSORS AND SURVIVORS, PAPA, FROM EMPLOYMENT, ALL PREVIOUS CHARGES AGAINST AND

1-3 THIS IS PLACING SUBJECT.

000159

Comment Number: VI-A

Docket Number: LD10-00054

Commenter: The Chlorine Institute Inc.

Response:

The Agency appreciates the information provided on the types and quantities of D009 wastes generated by mercury cell chlor-alkali producers. The information provided will be considered in the capacity analysis for D009 wastes when they are analyzed for the Third Third rule.

000160